DETAIL PROJECT REPORT

VISHWAKARMA YOJNA: VIII
AN APPROACH TOWARDS RURBANISATION
KUNKNI Village

SURAT District

PREPARED BY

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
PATEL DIVYA D.	CIVIL	170090106031
MARU VISHAL M.	CIVIL	170090106017
SAVALIYA VINAY R.	ELECTRICAL	160090109045

C.K. PITHAWALA COLLEGE OF ENGINEERING AND TECHNOLOGY

NODAL OFFICERS NAME

Dr. Boski P. Chauhan
(Civil Department)

Prof. Hetal H. Jivanramjiwala
(Electrical Department)

YEAR: 2020-21

GUJARAT TECHNOLOGICAL UNIVERSITY
Chandkheda, Ahmedabad – 382424 Gujarat

DETAIL PROJECT REPORT

ON

Vishwakarma Yojana: Phase VIII

AN APPROACH TOWARDS RURBANISATION

KUNKNI Village

SURAT District

Prepared By

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
PATEL DIVYA D.	CIVIL	170090106031
MARU VISHAL M.	CIVIL	170090106017
SAVALIYA VINAY R.	ELECTRICAL	160090109045

C.K. PITHAWALA COLLEGE OF ENGINEERING AND TECHNOLOGY

NODAL OFFICERS NAME

Dr. Boski P. Chauhan
(Civil Department)

Prof. Hetal H. Jivanramjiwala
(Electrical Department)

Year: 2020-21

Gujarat Technological University,
Chandkheda, Ahmedabad – 382424 Gujarat

CERTIFICATE

This is to certify that the following students of Degree/Diploma Engineering successfully submitted

Detail Project Report for,
VILLAGE KUNKNI
DISTRICT SURAT

Under

Vishwakarma Yojana: Phase-VIII

In partial fulfillment of the project offered by

GUJARAT TECHNOLOGICAL UNIVERSITY, CHANDKHEDA
during the academic year 2020-21.

This project work has been carried out by them under our supervision and guidance.

STUDENT NAME	BRANCH NAME	ENROLLMENT NO
PATEL DIVYA D.	CIVIL	170090106031
MARU VISHAL M.	CIVIL	170090106017
SAVALIYA VINAY R.	ELECTRICAL	160090109045

Date of Report Submission:	
Principal Name and Signature:	**DR. ANISH H. GANDHI**
VY-Nodal Officer Name and Signature:	**DR. BOSKI P. CHAUHAN** **PROF. HETAL JIVANRAMJIWALA**
Internal(Evaluator) Guide Name and Signature:	**PROF. PRANAV DESAI** **PROF. HETAL JIVANRAMJIWALA**
College Name:	**C.K.PITHAWALA COLLEGE OF ENGINEERING AND TECHNOLOGY**
College Stamp:	

ABSTRACT

The Government of Gujarat has launched Vishwakarma Yojana (scheme) for development of villages by identifying the requirements of villages. Under this scheme, the villages are surveyed and this project was identified and selected for implementation. Rurbanization is to bring peace of mind to the villagers by providing them the basic amenities required and still keeping the villages. This project gives one new idea for Development of rural villages. Also gives procedure how they fulfil requirement of the villages. Now a day people are moving from rural to urban are due to lack of basic amenities. With the help of this Yojana we can bring awareness about the thing which are not available at rural areas. So this help to provide better solution for the available problems in rural area like drinking water, Drainage facility, road network, etc.**"Developing village with a 'rural-soul' but with all urban amenities that a city may have."** The main objective of this Yojana is **"Creation of Infrastructure- connectivity, civic and social infrastructures along with provision of alternative Economy generation is the key pillar that the concepts hinges on."**

Kunkni is a medium size village located in Olpad Taluka of Surat district, Gujarat. Total 169 families residing. The Kunkni village has population of 856 of which 438 are males while 418 are females as per Population Census 2011. It is situated 18km away from sub-district headquarter Olpad and 16km away from district headquarter Surat. The total geographical area of village is 237 hectares. In Kunkni village population of children with age 0-6 is 100 which makes up 11.68 % of total population of village. Kunkni village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Kunkni village was 92.72 % compared to 78.03 % of Gujarat. In Kunkni Male literacy stands at 97.18 % while female literacy rate was 87.98 %.
As per constitution of India and Panchayat Raj Act, Kunkni village is administrated by Sarpanch (Head of Village) who is elected representative of village.

Kunkni is a small village located in the Olpad Taluka district of Surat.Literacy rate is high and m ost people are engaged in livestock farming: main –rice, sugarcane, vegetables, some of which are in the service sector (Govt.). Water facilities are available for agriculture and household Use during the season. Supplies are open. The GEB electrical supply is also available 24*7. There are also private vehicles, various schemes for women, children, farmer growth, etc.

Main two basic amenities are fulfill i.e. water and electricity by the govt. and the roads are also developed under various scheme. We have design other amenities which are lacking. Clinic, Anganwadi, Solid waste disposal management, water tank, sewage treatment plant, irrigation system, etc. as there is vast land covered for agricultural purpose we have provided sprinkler irrigation methods, less water is waste, no health care facility is available, existing condition of anganwadi is not good and dimension/size is less. Municipal waste collection system is also not there and even the panchayat also does not have its waste collection system, so Bins/Can is provided at the end of the village.

Future scope of growth of the village is the provision of a proper school, panchayat building, the general store, beautification of lake, etc.

Key Words: Vishwakarma yojana, Infrastructure, Survey, Planning, Design.

ACKNOWLEDGEMENT

We are highly indented to **Gujarat Technological University**, Ahmedabad for providing us such opportunity to work under Vishwakarma Yojana to get real work experience and applying our technical knowledge in the development of Villages.

We wish to express our deep sense of gratitude to **Prof. (Dr.) Navin Sheth**, **Hon'ble Vice Chancellor, Gujarat Technological University-Ahmedabad**, for his encouragement and giving us the wonderful project.

We also express our gratitude to **Dr. K.N.Kher**, **Registrar, and Gujarat Technological University-Ahmedabad** for giving us complete support.

We express our sincere thanks to **Commissionerate of Technical Education, Gujarat State** for appreciating and acknowledging our work.

We express our sincere thanks to **DDO, TDO, Sarpanch, Talati and staff members of Ahmadabad** District for providing us with requisite data whenever we approached them. Especially our thanks are to all villagers and stake holders for their support during Survey.

We are also thankful to our **Prof**. (**Dr.) Anish Gandhi Principal**, faculties of our colleges for their encouragement and support to complete this project work.

An act of gratitude is expressed to our internal guide / Evaluator / Nodal Officer, **Prof. Pranav Desai (Civil) & Prof. Hetal H. Jivanramjiwala (Electrical) / Dr. Boski P. Chauhan & Prof. Hetal H. Jivanramjiwala from college** for their I valuable guidance, constant inspiration and active involvement in our project work.

We are also thankful to all the experts who provided us their valuable guidance during the work. We express our sincere thanks to, **Dr. Jayesh Deshkar, Hon'ble Director of Vishwakarma Yojana project and Principal, V.V.P Engineering College and Core Committee member of Vishwakarma Yojana project Prof(Dr.)Jigar Sevalia**, Professor, SCET, Surat, **Prof. K. L. Timani,** Associate Professor,VGEC, **Prof.Rena Shukla**, Associate Professor, LD Engineering College, **Prof.Y.B.Bhavsar,** Associate Professor,VGEC, **Prof.Jagruti Shah**, Assistant Professor, BVM Engineering College for providing us technical knowledge of this project work.

We are also thankful to **Ms. Darshana Chauhan, Vishwakarmrma Yojana**, for all support during our work. We therefore, take this opportunity for this Project work expressing our deep gratitude and sincere thanks for her cooperation to produce this project work in the present form.

Above all we would like to thank our Parents, family members and Friends for their encouragement and support rendered in completion of the present this work.

CONTENT

LIST OF FIGURES

LIST OF TABLES

ABBREVIATIONS

SHORT NAME / SYMBOL	FULL NAME
Wi-Fi	Wireless Fidelity
DGVCL	Dakshin Gujrat Vij Company
GEB	Gujrat Electricity Board
ppm	Parts per million
km	Kilometer
DDO	District Development Officer
TDO	Taluka Development Officer
RCC	Reinforced cement concrete
PMGSY	Pradhan Mantri Gram Sadak Yojana
SBA	Swachh Bharat Abhiyan
PMJDY	Pradhan Mantri Gram Sadak Yojana
ICDS	Integrated Child Development Scheme
NFFWP	National Food For Work Programme
UN	United nations

AD	Anaerobic digester
CSC	Concentrate solar cooker System
CSP	Concentrate solar power
SHS	Solar home system
PV	Photovoltaic
RPR	Residue to product ratio
DWWT	Decentralised Wastewater Treatment
MMS	Moisture monitoring system

CHAPTER 1: SMART VILLAGE VISIT FROM DISTRICT OF GUJARAT STATE

1.1 Background & Study Area Location

Background of the Baben village

"Bench mark for the development of other villages in India: BABEN village". In the history this Baben village had received swarnim gram award in the year 2012 and a cash prize of Rs 4500000/-. It had also received many such awards from the year 2007-2016. Baben village got the best gram panchayat of the year award in 2011 from the state government. The tax collection of Baben village is raised higher compare to the other villages by villagers through miscellaneous schemes and government fund. According to Baben Gram Panchayat Sarpanch Bhavesh Patel they were taking contribution from real estate developers who come to develop land and houses in the village and use that money for development of the basic amenities for the residents of the village. The village Panchayat collected Rs 3 crore in the past five years from the real estate developers and used that money on roads, street lights, a lake, public toilets, drainage and water system for the 15,000 people of Baben village. The village also has a degree and diploma engineering college, a school and number of restaurants. A developer was charged Rs 2,000 per plot. The buyer of the plot was too charged the same amount by the Panchayat. The number of occupied people of Baben town is 6628 yet 982 are non-working. And out of 6628 occupied individual 131 individuals are fully dependent on agriculture.

Study area Location of Baben village

Baben is a village panchayat located in the Surat district of Gujarat state, India. The latitude 21.1378786 and longitude 73.0966019 are the geo coordinate of this village. Gandhinagar is the state capital for this village. It is located around 245.2 kilometers away from Baben. Baben village which is located about 34 km from Surat city typifies development. Here villagers enjoy all the facilities that one living in the city enjoys. The 2-km road from Bardoli to Baben gives a commuter the feeling of passing through a highway this is because the village road is 12 meter wide and is well lit with street lights. This road has not been constructed.

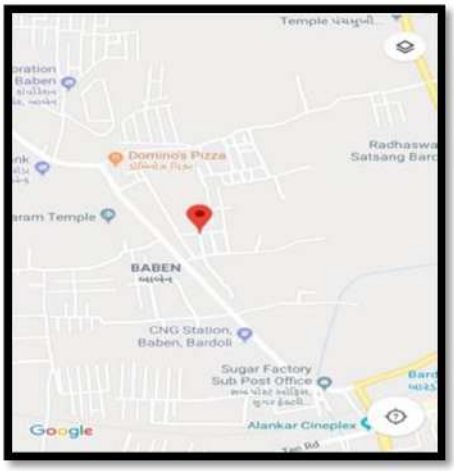


Figure 1 - Location of Baben Village

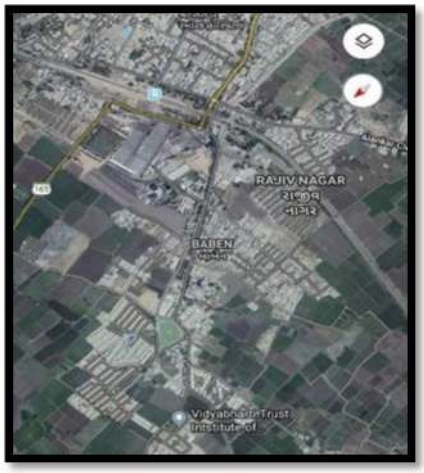


Figure 2 - Map of Baben village

1.2 Concept: Ideal Village, Normal Village

1.2.1 Objectives

Objectives of ideal village

The Ideal Village Concept is a community village with a self-sustaining income producing projects, independent electrification system generated from non-fuel based device, clean water facility for drinking including water for irrigation, quality but affordable housings, school, medical facilities for human beings and animals, proper sanitation system, information center, bank, police station, retail outlet for household and agriculture needs, phone facility, connecting roads to nearby villages and towns, legal councilor.

Provide drinking water security through an integrated combination of pipe, local traditional water sources and multiple sources for alternative use. Conserve water through water resource management that includes rainwater harvesting and artificial recharge, conservation and renovation of traditional water sources. Build effective community institutions at the local level by supporting capacity building and empowerment. Ensure that all community groups, including women, are able to participate in the decision-making processes and benefit from program improvements and improve household and community environments with sanitation improvement and increased hygiene awareness in communities.

Objectives of Normal village

Create a healthy and environmentally sustainable community. To encourage the provision of local business services within the village. Encourage slow and sustainable development that maintains the village's rural and historic character and identity. Improve pedestrian and traffic safety within the village. Cooperate on planning and future development activities. Maintain the historic village character and identity and Preserve heritage buildings within the village. Develop new transportation infrastructure to make the village safe and accessible via all modes of transportation. Cooperate on planning and future development in consideration of the village as a whole. Increase economic development. Maintain the quiet rural character.

1.2.2 Example / Live Case studies of ideal village of India/Gujarat

Punsari village, Gujarat

This is a village in Gujarat region, nearby Gandhinagar. Punsari has been dubbed a "model village" by the state government and its young headman, Himanshu Patel, proudly states that his village offers "the amenities of a city but the Spirit of a village".

About the Village

- Every house has a toilet, two primary schools and healthcare
- Street lights and drainage system
- Enabled with CCTV camera and Wi-Fi
- Public Address system with 140 loudspeakers which cover entire village
- No school Dropouts
- Midday meal schemes in schools
- Offers computer classes

Punsari, located in Gujarat, puts most metros to shame. Funded by the Indian government and the village's own funding model, Punsari is no NRI-blessed zone. The village also boasts of a mini-bus commute system and various other facilities. Believe it.

1.2.3 The Idea of a model/Smart Village

Such a village will have a fully-operational Gram Panchayat or local government that will be responsible for the holistic development of the area. It will provide better living standards and quality of life to people of different walks of life. It will provide access to improved basic amenities, including educational institutions, healthcare facilities, drinking water, sanitation, along with the rights and entitlements. This village will use technological innovations to achieve higher productivity in farming and to help local businesses by mobilizing self-help groups. It will provide residents improved infrastructure such as roads, parks, drainage system, etc.

Objectives of model village

A model village project has the following important objectives: Prevent distress migration from rural to urban areas, which is a common phenomenon in India‘s villages due to lack of opportunities and facilities that guarantee a decent standard of living. Provide easier, faster and cheaper access to urban markets for agricultural produce or other marketable commodities produced in such villages. Contribute towards social empowerment by engaging all sections of the community in the task of village development. Create and sustain a culture of cooperative living for inclusive and rapid development.

The challenges

Social mobilization: One of the major challenges is the lack of awareness among citizens about such schemes. The aim should be to engage the residents and empower them through community programs that can create awareness and impart training for village-level maintenance of the infrastructure.

Basic facilities: The administrators will have to attend to the primary needs of the residents first. These include access to clean water, proper sanitation, etc. The aim should be to provide better quality of life and then move to other areas that need to be addressed. Not just housing: Apart from providing affordable housing, the government should also work towards creating sustainable employment means.

1.2.4 Ancient History Civil / Electrical concept about Indian Village / Foreign Countries Perspective and its Development

It might be appropriate to assume that the science of civil engineering truly commenced between 4000 and 2000 BC in Egypt when transportation gained such importance that it led to the development of the wheel. According to the historians, the Pyramids were constructed in Egypt during 2800-2400 BC and may be considered as the first large structure construction ever. The Great Wall of China that was constructed around 200 BC is considered another achievement of ancient civil engineering. The Romans developed extensive structures in their empire, including aqueducts, bridges, and dams. A scientific approach to the physical sciences concerning civil engineering was implemented by Archimedes in the third century BC, by utilizing the Archimedes Principle concerning buoyancy and the Archimedes screw for raising water.

The role of investment, especially foreign direct investment (FDI), in driving economic growth and development has been a contested one ever since the UN development decade of the 1960s. There have always been views in favor of FDI and against it. Some argue that FDI leads to economic growth and productivity increases in the economy as a whole and hence contributes to differences in economic growth and development performances across countries, but others stress the risk of FDI destroying local capabilities and extracting natural resources without adequately

compensating poor countries. This background paper for UN World Economic and Social Survey examines trends in the relationship between FDI and development in an historical context.

The government considers a village to be electrified if the number of households electrified is at least 10% and electricity is provided to public buildings including schools, health centers, dispensaries, community centers and village councils. So, by definition, all Indian villages have now been electrified. Remote and inaccessible villages have always proved to be a major challenge in the country's electrification drive. Though most Indian villages have some electrical connection today, connecting the last remote households in the surrounding areas can be expensive. Additionally, state-owned power distribution companies are struggling with debt and poor demand, which has made it difficult to practically electrify every Indian household.

1.3 Detail study (Socio economic, physical, Demographic and infrastructure details) of Ideal village / Smart Village with photograph

Social scenario

Another essential facility for any village is Social Infrastructure Facility which leads to development of the village to the greater extent. Baben is a village having all the social infrastructure facilities such as Schools, Colleges and Primary Health Centers etc. There are 12 Anganwadi 2 Primary Schools and a College near Baben village which accommodates around 5000-6000 students which plays an important role in the economic development of the village. All these facilities are essential for the growth of a village and as Baben has all these facilities it is considered to be developed or facilitated village. All these facilities are essential for the growth of a village and as Baben has all these facilities it is considered to be developed or facilitated village.

Economic profile

The economic status of Baben gram panchayat is much better as compared to other villages or rural towns. Baben panchayat collects around 1.5 crore rupees as various taxes and funds from private as well as government sectors. The various sources of income are housing tax, income tax, water tax, electricity bills, cleaning charges, taxes from Bardoli sugar factory etc. Various taxes collected by Baben gram Panchayat are as shown in below;

Table 1 - Various Taxes Collected By Baben Gram Panchayat

Serial number	Particular Tax	Amount (Rs)
1	Housing tax	30,65,820
2	Jilla panchayat tax	3,06,582
3	Electricity tax	82,700
4	Water tax	2,30,440
5	Cleaning tax	3,06,570
6	Income tax EC	36,64,630
7	Income tax RC	85,400
8	Sales tax	4,54,660

So, based on the above data we can say that the economic profile of Baben village is very much strong as compared to other villages.

Figure 3 – Play Group

Figure 4 - Primary School

Figure 5 - Anganwadi

Figure 6 - Public Health Centre

Physical and Demographical Growth

These facilities are essential for economic as well as social growth of any area. These facilities include proper road network, water supply, drainage, electricity etc. Any village which needs to be economically developed must contain the above-mentioned facilities. Baben is a village facilitated with bituminous and R.C.C. roads for main village roads as well as society streets. The roads are facilitated with sign boards, markings and signals for proper functioning of the vehicular traffic as well as pedestrian's traffic. The village is facilitated with 32 CCTV cameras for proper monitoring and protection from thefts, damages etc. to the village. The roads are also facilitated with proper street lights for 33 night travel.

Pure Drinking Water for morning and evening peak hours is also provided door to door with the help of 6 over head water tanks which range from 15000L to 25000L which are cleaned at regular intervals to maintain hygienic conditions. Along with the facility of pure drinking water the facility for the removal of waste water is also provided. Drainage network for the whole town is constructed from door to door and is connected to the main sewage line at Bardoli Taluka. Along with sewage disposal solid waste management is also given a wide importance and is collected from door to door with the help of 3 collecting vans and is given to the Bardoli Nagarpalika for disposal and treatment. 5 public toilets are also constructed with the help of government grant and by the fund collected from the local residents which had led the people to leave a better life than before.24hrs electricity supply is also provide to the residents from GEB.

Infrastructure facility

Similarly, as social infrastructure Socio-Cultural Infrastructure Facilities are also essential for any village to compete with the urban area and any village must have all the above-mentioned facilities so that the residents of village may not get forced to migrate to the urban areas. If the village or panchayat is facilitated with all the above facilities people can leave in rural area with more comfort and ease.

The village Baben has all the socio-cultural facilities such as playground, library, garden, recreation facilities, community hall etc. A project named AVADH LAKE CITY has led the development of the village to a greater extent which is located in the central part of the village and works as a recreational hub for the residents as well as outsiders. Other than the above facilities 1 CNG Pump, 1 Petrol Pump, 12 Temples and 2Masjids are also located in the premises of Baben. This leads to the growth of town to a greater extent life than before.24hrs electricity supply is also providing to the residents from GEB.

Figure 7 – Rectangular water tank

Figure 8 - Statue of Sardar Vallabhbhai Patel at Lake

Awards achieved by baben village

Shresth Gram Panchayat Competition Swarnim Puraskar 2010-2011.
Shresth gram panchayat competition Swarnim Puraskar 2010-2011.

1.4 Future prospects of the ideal/smart village

Baben village can be developed as an educational and recreational hub due to development of Avadh lake city and other upcoming infrastructure projects near the village and due to Vidyabharti college campus in the premises of Baben village. Local business and employment opportunities can also be improved with regards to increase in the physical and social development of the village. As the Baben is surrounded with industrial facilities like Bardoli sugar factory the expansion of this sugar industry may possible in future.

Figure 9 - Lake

Figure 10 - Vidyabharti College

Figure 11 - Bardoli Sugar Factory

1.5 SWOT analysis of ideal/smart village

Table 2 - SWOT Analysis of Smart Village - Baben village	
Strengths	Weaknesses
•Ponds and sidewalks •Lake site •Local businesses •Schools and colleges •Religious places (temples/masjid) •Excellent water quality •Easy access to highway •parking facilities •Police / fire	•No facility of clubs for adults and seniors •Need to upgrade village parks and playgrounds
Opportunities	Threats
•Opportunity for more events in parks, •ponds and open space •Construction of public library •Construction of movie theatre •Opportunities for local business •Redevelopment of vacant land •Entertainment parks	•Algae in ponds •Accidents due to rough driving by college students •High commercial rents

1.6 Benefits of the visit of ideal village / smart village

The Sarpanch of Baben gram panchayat gave us a brief idea of the methods, techniques, strategies that must be used for the development of any village and what plays an important role in the development of any village, as Baben has developed a great deal during the year's 2007 to2016. We have had good knowledge of rural development and general infrastructure facilities to be provided in the village. By visiting such villages, we students of civil engineering can understand about the actual development that a rural area needs to satisfy its basic infrastructure facilities and to compete with urban area and can implement these techniques and facilities for the development of other villages which actually needs development and can implement the same for the development of the villages which are allotted to us in Vishwakarma Yojana Phase-VIII as our final year project.

We enjoyed lot during this visit and also we experienced lots of new things that not available in city. We got new ideas to develop the village facilities. We came to know what facilities actually needed in village. We have seen the facilities exist and their conditions like, road network, Water distribution and management, Gram, Panchayat management, Connectivity with city. To study about the development as well as the infrastructure facilities of the villages which is an ideal village and can be considered as Benchmark for the development and growth of other villages which are developing or which needs development? After visiting the village, we came to know about the various facilities that can be provided in a village for Rurbanization of village and to reduce the migration of people from villages to city areas. We also came to know about the various methodologies and techniques that can be used for the development of the villages. We came to know about the tax collection and finance management of Baben village differs from other villages in terms of amount and its use. Other villages are lacking from the finance but Baben has full finance support but due to the limit of using it for the various purposes is not allowed and limited for certain level as it comes under village.

1.7 Electrical / Civil aspects required in Ideal village / Smart Village

Baben is village with basic power infrastructure such as transformer and distribution line provided to inhabited locality too and the electricity is for any purpose in its revenue boundary. Hence, we can say this village as Electrified village. Electricity provided to public places like schools, panchayat offices etc. The community hall has Television Facility. The village is facilitated with 32 CCTV cameras for proper monitoring and protection from thefts, damages etc. The roads are also facilitated with proper street lights for night travel. The Baben village has underground system for transmission of power supply for the half of the village. The remaining village will be underground electrified in future according to Sarpanch Bhavesh Patel. DGVLC BARDOLI DIVISION OFFICE, which supplies electricity to the whole baben village. DGVCL is only 5km away from this village. 24hrs electricity supply is also providing to the residents from GEB.

Governance of Smart Village: Information and Communication Technologies (ICT) play an instrumental role in the governance of a Smart Village. ICT can help in streamlining he existing processes and interaction and communication across all levels of people involved in Governance of the Smart Village. New technologies like Cloud Computing in Smart Data Center can be adopted to maintain huge amounts of data at village level or by groups of villages at district level. This can avoid Operation and Maintenance (O&M) overheads of huge servers at the village level where not much talent would be acquainted with the rigorous server operations. This can ease the work involved in governance, giving the opportunity to focus on the core governance of the village.

CHAPTER 2: LITERATURE REVIEW – (CIVIL & ELECTRICAL CONCEPT)

2.1 Introduction: Urban & Rural

Urban: An urban area, or built-up area, is a human settlement with a high population density and infrastructure of built environment. Urban areas are created through urbanization and are categorized by urban morphology as cities, towns, conurbations or suburbs. In urbanism, the term contrasts to rural areas such as villages and hamlets; in urban sociology or urban anthropology it contrasts with natural environment. In 2014 there were 7.2 billion people living on the planet, of which the global urban population comprised 3.9 billion. The Population Division of the United Nations Department of Economic and Social Affairs at that time predicted the urban population would grow to 6.4 billion by 2050, with 37% of that growth to come from three countries: China, India and Nigeria.

India : For the Census of India 2011, the definition of urban area is a place having a minimum population of 5,000 of density 400 persons per square kilometer (1,000/sq. m) or higher, and 75% plus of the male working population employed in non-agricultural activities. Places administered by a municipal corporation, cantonment board or notified town area committee are automatically considered urban areas. The Census of India 2011 also defined the term "urban agglomeration" as an integrated urban area consisting of a core town together with its "outgrowths" (contiguous suburbs).

Rural: **“India lives in its villages” – Mahatma Gandhi**

This famous observation made by the Father of the Nation many years ago, still holds true. Villagers comprise the core of Indian society and also represent the real India. And it is for villagers who need to make sure we build a system that delivers basic social infrastructure in an effective manner. In order to ensure that the fruits of India’s progress are shared by all sections of the society, the government has identified several elements of social and economic infrastructure, critical to the quality of life in rural areas.

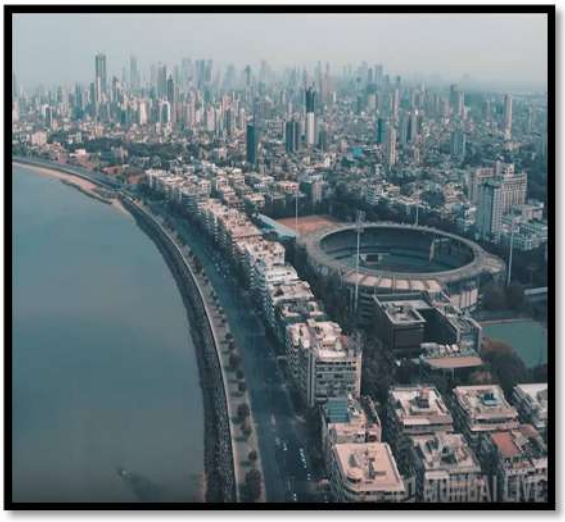


Figure 12 – Urban

Figure 13 - Rural

2.2 Importance of the rural development

Rural development is important not only for the majority of the population residing in a rural area but the growth of rural activities is necessary to stimulate the speed of overall economic expansion of the nation. Rural development is pretended to be noticeable importance in the country today than in the olden days in the process of the evolution of the nation. It is a strategy trying to obtain improved rural creation and productivity, higher socio-economic equality, and ambition, stability in social and economic development. The primitive task is to decrease the famine roughly about 70 percent of the rural population, implement sufficient and healthy food. Later, serve fair equipment of clothing and footwear, a clean environment and house, medical attention, recreational provision, education, transport, and communication.

2.3 Ancient Villages / Different Definition of: Rural Urban Villages

Typical rural areas have a low population density and small settlements. Agricultural areas are commonly rural, as are other types of areas such as forests. Different countries have varying definitions of rural for statistical and administrative purposes. Rural areas are also known as the 'countryside' or a 'village' in India. It has a very low population density. In rural areas, agriculture is the chief source of livelihood along with fishing, cottage industries, pottery etc. In India, the "rural sector" means any place as per the "latest census" which meets the following criteria. A population should be less than 5,000. Density of population less than 400 per sq. km and more than "25 per cent of the male working population" is engaged in agricultural pursuits.

2.4 Scenario: Rural / Urban village of India population Growth

According to the provisional reports released on 31 March 2011, the Indian population increased to 1.21 billion with a decadal growth of 17.70%.Adult literacy rate increased to 74.04% with a decadal growth of 9.21%. The motto of the census was ‘Our Census, Our future’. Transgender population was counted in population census in India for the first time in 2011.The overall sex ratio of the population is 940 females for every 1,000 males in 2011. The official count of the third gender in India is 490,000.

Table 3 Population Growth

Population	Total	1,210,854,977
	Males	623,724,568
	Females	586,469,294
Literacy	Total	74%
	Males	82.10%
	Females	65.46%
Density of population	per km^2	382
Sex ratio	per 1000 males	940 females
Child sex ratio (0–6 age group)	per 1000 males	914 females

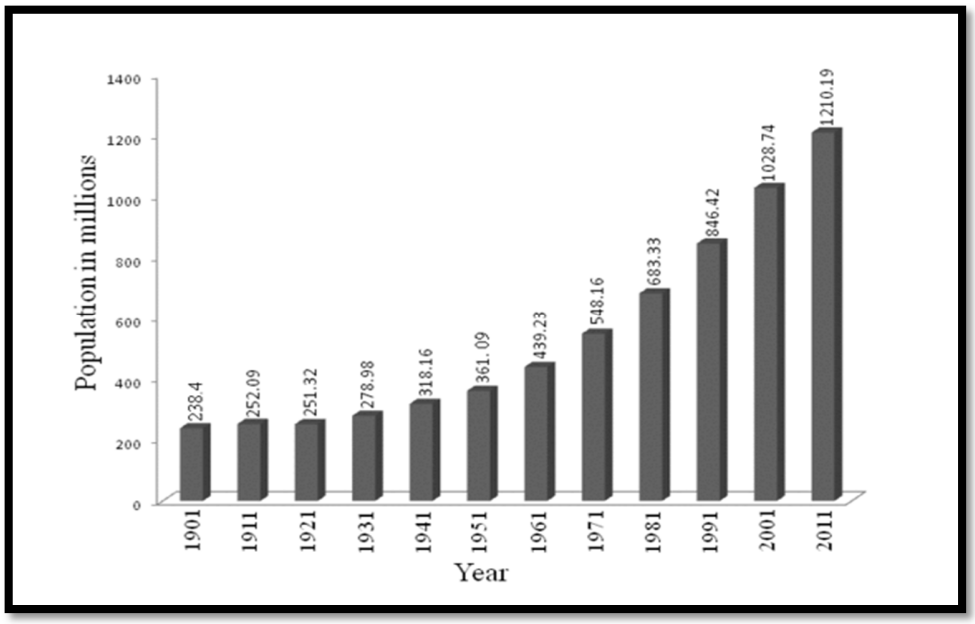


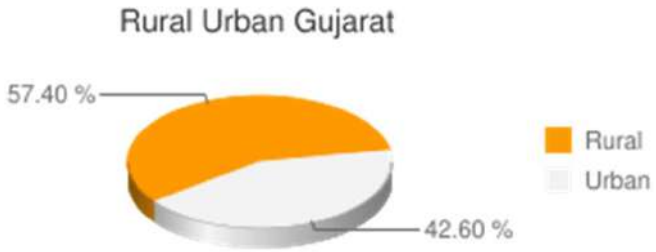
Figure 14 – Population increase chart 1901-2011

2.5 Scenario: Rural / Urban village of Gujarat as per Census 2011 and latest

Gujarat Population 2011

As per details from Census 2011, Gujarat has population of 6.04 Crores, an increase from figure of 5.07 Crore in 2001 census. Total population of Gujarat as per 2011 census is 60,439,692 of which male and female are 31,491,260 and 28,948,432 respectively. In 2001, total population was 50,671,017 in which males were 26,385,577 while females were 24,285,440. The total population growth in this decade was 19.28 percent while in previous decade it was 22.48 percent. The population of Gujarat forms 4.99 percent of India in 2011. In 2001, the figure was 4.93%. Recently as per Gujarat census data, 83.92% houses are owned while 13.54% were rented. In all, 65.95% couples in Gujarat lived in single family. In 2011, 57.87% of Uttar Pradesh population had access to Banking and Non-Banking Finance Corporation. Only 3.13% of Uttar Pradesh population had internet facility which is likely to improve in 2021 due to Jio. 6.10% of family in Uttar Pradesh owned car while 34.14% owned two wheeler. In few months we will also get details of election data for Gujarat.

Gujarat Population 2020



As per projection, population of Gujarat in 2020 is 7.04 Crore.

Fig.-15 Rural Urban Gujarat

TABLE – 4 GUJ. POPULATION CENSUS 2011	
Description	**2011**
Approximate Population	6.04 Crores
Actual Population	60,439,692
Male	31,491,260
Female	28,948,432
Population Growth	19.28%
Percentage of total Population	4.99%
Sex Ratio	919
Child Sex Ratio	890
Density/km²	308
Density/m²	798
Area (km²)	196,244
Area (m²)	75,770
Total Child Population (0-6 Age)	7,777,262
Male Population (0-6 Age)	4,115,384
Female Population (0-6 Age)	3,661,878
Literacy	78.03 %
Male Literacy	85.75 %
Female Literacy	69.68 %
Total Literate	41,093,358
Male Literate	23,474,873
Female Literate	17,618,485

2.6 Rural Development Issues - Concerns – Measures

In order for India's economy to be strong, the rural economy needs to expand. Rural areas are also affected by problems of malnutrition, illiteracy, unemployment and lack of basic infrastructure, such as schools, colleges, hospitals, sanitation, etc. This has led young people to emigrate from the villages to live in the cities.

Problems in rural development are as follows:

- Linked People
- Agricultural related issues
- Infrastructure related concern
- Economic issues
- Leadership related concern
- Administrative issues.
- Etc.

The adaptation of government’s values into the rural environment includes the following elements:

- Rural environment as a complex and dynamic strategy
- It involves rural people’s satisfaction and loyalty
- Changing attitude of the rural society
- Focusing on continuous people service

- Maintain a constant updating technological changes
- High technological purgation and modernization
- Implement of the people friendly policies.

Ways and Means of Rural Development: After our independence, the conditions of the villages have been improved. The problems of our villages are many and various. For their solution, intelligent guidance of both the government and the people is needed. The ways and means of rural development:

- Education of the masses
- Establishment of night schools for adults
- Improvement of sanitation
- Provisions for cheap medical aid
- Construction of good roads
- Establishment of co-operative credit societies

2.7 Various infrastructure guidelines with the Norms for Villages for the provisions of different infrastructure facilities

Norms and Standards Norms and Standards for Infrastructure provision and construction activities are essential to promote development of amenities as well as sustainable built up environment for human habitation. The standards for building construction and infrastructural allocations have been prescribed by National Building Code of Bureau of Indian Standards, Indian Road Congress etc. in various sectors of infrastructure construction and development.

There have been standards and norms in existence and enforced to a certain extent by the relevant statutory authorities in urban areas but compliance to the same in rural areas is virtually non-existent. Hence the construction activities in rural areas are by and large unregulated resulting in organic growth which is characterized by haphazard development and access to basic facilities remains a big challenge in rural areas. The formulation of norms and standards has to be in congruence to a sustainable land utilization plan. There are many norms made by the government out of them one or two are highlighted below.

Habitat Planning in Rural Areas

While planning for housing in rural settlements the following factors shall be taken into consideration:

- Ecosystem and Biodiversity.
- Identity of the place rooted in its culture and heritage.
- Nearness and connectivity with nearby urban centers.
- Occupation related requirements.
- Water and Waste management.
- Land records and Land tenure.
- Facilities like branch of co-operative bank, a fertilizer depot, a veterinary hospital, market place and a branch of the co-operative consumer store besides facilities for educational and health care should be available within a maximum distance of 5 km from any settlement.
- Proposed Road Hierarchy

Norms for Low Income Housing development.

- Plot size : 80 m^2, Minimum
- Density (Gross) : 60 plots per hectare, Maximum
- Minimum frontage : 6 m
- Ground coverage : 33percent (subject top a maximum of 50 percent)
- Floor area ratio (FAR) : 2, Maximum
- Open spaces : 1.21 hectare open space for a village with 200 houses.

Criteria for selection of technology.

Implementation of solid and liquid waste management technologies faces a challenge of financial viability greater than the urban areas. The technique for selection should go by the:

- Cost effectiveness of the technology
- Area constraints if any in the area of implementation.
- Slope , drainage, water level and soil type
- The population it can serve.

It would be desirable, if several villages can pool together a facility with least distance to be covered. The Rurban settlements can follow URDPFI guidelines in implementing a centralized Solid and Liquid waste management system. Similarly the Villages adjacent to a municipality can become a part of the integrated urban waste management system.

2.8 Ancient / Existing Electrical concept study as a Literature Review for village development

Most households in rural developing countries do not have access to modern energy supply. Household level biogas energy was considered as an option but failed due to lack of sufficient resources for its installation and operation. A community energy system can be an option, but most studies focused on off-grid electricity. This energy system cannot be a realistic option particularly for cooking demand. An efficient and suitable system matching local resources and demand expectation needs to be developed which this study focuses on assessing. Biogas and solar energy technologies are viable to establish such kind of a system since they can be converted to different forms of energy. Therefore, this study aims to determine efficient biogas and solar energy production and utilization options for small scale village energy application in rural Ethiopia.

Methods

The efficiencies of the production and utilization options are determined based on the system configurations involving resource, conversion, and utilization combination models. We used local resources, data, and relevant literature information for the system analysis.

Results

The analysis shows that most energy is needed in the form of heat for cooking and a smaller part in the form of electricity (about 10%). The community waste stream converted to biogas will be enough for cooking, but not enough biogas is left to produce enough electricity. Co-digesting altogether provides biogas that can meet only about 75% of the electricity demand. Concentrated solar cookers can be an alternative for cooking in areas where installation of biogas is not possible.

About 2-m^2size solar concentrator is sufficient to meet each household's cooking energy demand. The lighting and appliance energy demand can be met with photovoltaic (PV) energy produced with reasonably sized panels. However, the use of electrical energy for cooking produced with PV cannot be an economic option with the available technologies.

Conclusions

The community energy system involving anaerobic co-digestion (biogas) and/or solar energy technologies is viable to meet the demand when efficient production and conversion is made based on specific local resource supply and demand.

Solar Panels

The Supply of electricity is quite unreliable in most part of Indian villages. Due to increased scheduled and un-scheduled power cuts in most of the cities and villages in India, interest in using electricity generated through alternate sources has also increased. Therefore use of renewable energy is become the need. Solar panels designed to absorb sunrays as source of energy for generating electricity. Some solar panels have efficiency exceeding 19%. As a part of this mission the government has initiated a subsidy scheme to help the individual and organization. Initially the subsidy was 30% but now it is modified to 40% on the capital cost of solar system for rural and urban areas. For kunkni village we provide solar panels on the reservoir. Provisions of 15 KW electricity generations for those 60 solar panels are required. The amount required for that 16,50,000 Rs.

Solar Street Light

Solar street lights harness energy from the sun to provide an alternative source of energy to conventional street lighting. Benefits:

1. Zero running cost.
2. Guarantied working in rainy weather.
3. No schedule maintenance for up to 5 years.
4. Environment friendly 100% powered by the sun.
5. Solar panels reduce fossil fuel consumption 9.6 Solar Street light

Dimension:

L=34.5cm, B=17cm, Wt. =2.5kg, pole ht. =10Ft, Position = underground. All India courier cost for the street light = 3000 Rs.24 streetlights are existing which are obtained from Samaj kalyan and Aamdar fund in kunkni village we provide 10 street lights, Total cost =10 X 3000= 30000 Rs. Government provide 30% subsidy of total project cost.

2.9 Other Projects / Schemes of Gujarat

Majort 3 projects are inaugurated by PM Modi in Gujarat recently

Girnar ropeway: A distance of 2.3 km will now be covered in just 7.5 minutes through the ropeway. Moreover, the ropeway will also provide a scenic view of the lush green beauty surrounding the Girnar Mountain.

Kisan Suryodaya Yojana: In a bid to provide a day-time power supply to farmers for irrigation, the BJP-led Gujarat government had recently announced the Kisan Suryodaya Yojana. Under this scheme, farmers will be able to avail power supply from 5 AM to 9 PM. The state government has

allocated a budget of Rs 3,500 crores for installing transmission infrastructure under this scheme by 2023.

Pediatric Heart Hospital: The institute is undergoing expansion at the cost of Rs 470 crores. After the completion of the expansion project, the number of beds will increase from 450 to 1251. The Institute will also become the biggest single super specialty cardiac teaching institute in the country and one of the biggest single super specialist cardiac hospitals in the world.

Kutumb Sahay (Familly Assistance) Scheme in Gujarat: The main breadwinner has to be a family member whose income constituted a major share of the family's total earnings. The death of such a bread-earner should have occurred whilst she/he is above 18 years of age and below 60 years of age. A woman in the family, who is a homemaker, is also considered as a 'breadwinner' under this scheme. The deceased's family shall qualify as a family living under the poverty line. The prime benefits of NFBS are its financial support for dependent beneficiaries. While the emotional loss or mental anguish can't be replaced with anything, financial assistance can make life easier for the deceased's family, especially those living under the poverty line.

Projects / Schemes by Private sector

The following organizations and companies are active in rural and renewable energy services:

Bosch India Under its CSR wing, Bosch is looking into implementing Photovoltaic projects in rural India. Together with Husk Power, Bosch has implemented a 5 kW solar mini grid in Bihar.

D.Light private company ("Silicon Valley Venture") manufacturing 3 types of small off grid lighting products. D.Light has received start-up financing by Shell Foundation and the Acumen Fund.

Envirofit is a private company selling improved cooking stoves in India as well as East Africa.

EnviTec Biogas is a joint venture of German biogas plant manufacturer with a local Indian biogas company is involved in setting up several biogas projects all over India.

GreyMatter Technologies in Bangalore, is the manufacturing company contracted by iSquareD to manufacture the Chulika stove. The plant has 14 staff. The manufacturing unit has a capacity of 300 stoves per day (1 shift).

Greenleaf is a private company involved in Biodiesel production from mainly Pongamia plantations in Bihar.

Greentech is a Delhi-based consultancy providing energy advisory services in the areas of buildings, renewable, small industries and carbon project development. Greentech has 6 staff members and is working with 14 associations which spread all over India. E.g. Bushlight (off-grid PV systems with intelligent load controllers) and all India solar water heater market assessment studies and surveys for different sectors and demand segments (under UNDP SWH project).

Food for Work Program (FWP):

This program was introduced in 1977 by the then Janta government with the objective to provide employment to the unemployed/underemployed village persons during the slack season. The wages paid to the workers were in kind, i.e., food grains.

CHAPTER 3: SMART (CITIES/ VILLAGE) CONCEPT AS PER YOUR IDEA AND ITS VISIT (CIVIL & ELECTRICAL CONCEPT)

3.1 Introduction: Concepts, Definitions and Practices

A smart city is an urban area that uses different types of electronic data collection sensors to supply information used to manage assets and resources efficiently. As the term "smart city" gains wider and wider, there is still confusion about what a smart city is, especially since several similar terms are often used interchangeably. The different metrics of urban smartness are reviewed to show the need for a shared definition of what constitutes a smart city, what its features are, and how it performs in comparison to traditional cities. Furthermore, performance measures and initiatives in a few smart cities are identified.

3.2 Vision-Goals, Standards and Performance Measurement Indicators

Vision:

- Homes for all
- Skill and village enterprise development with bank and market linkages gave more flexible access to youth.
- Provide Solid/liquid waste management system.
- End all preventable maternal deaths.
- Malnutrition free
- No girl child marriages
- Every villager has there Owen bank account.
- Tree plantation program
- Functional water conservation and harvesting structures.

Goal:-

- Smart building- security cameras, fire safety, electricity managements
- Smart dairy- removes super vision and monitoring in open fields and barns.
- Smart farming – satellite data for farm activities
- Smart agriculture – smart equipment for crop production
- Smart weather and irrigation – weather forecast water level in dams.
- Smart health care – smart beds and equipment to monitor patient.

Standards and performance measurement indicators.

The smart city of maturity and the benchmark model have been built to capture the core aspects of a city transition journey to a smarter city. A smart city is characterised by a high degree of community and citizen participation, attractiveness to businesses and effective and sustainable city operations. The model enables the city to easily identify its strengths and limitations in five main areas relevant to city smartness and to set specific priorities as to how it wants to transform. Key Performance Indicators (KPIs) are the elements of your plan that express what you want to achieve by when. They are the quantifiable, outcome-based statements you'll use to measure if you're on track to meet your goals or objectives. The anatomy of a structured KPI includes:

- A Measure – Every KPI must have a measure. The best KPIs have more expressive measures.
- A Target – Every KPI needs to have a target that matches your measure and the time period of your goal. These are generally a numeric value you're seeking to achieve.
- A Data Source – Every KPI needs to have a clearly defined data source so there is no gray area in how each is being measured and tracked.
- Reporting Frequency – Different KPIs may have different reporting needs, but a good rule to follow is to report on them at least monthly.

3.3 Technological Options

1. Smart energy

"Lighting is prevalent it's that people work, travel, shop, dine, and relax. Digital communications and energy-efficient LED lighting are revolutionized urban lighting infrastructures already in place, transforming them into information pathways with the capacity to collect and share data and offer new insights that enable, and really drive, the smart city,"

2. Smart transportation

The smart city promotes multimodal transport, smart traffic lights and smart parking. "One of the key areas that we have seen a lot of activity on has to do with mobility. Anything around transportation, traffic monitoring, parking," said Sanjay Khatri, Director of Product Marketing and IOT Services for Jasper. "There are areas where cities are having a very rapid return on investment. Not only does it help to minimize the cost of policing parking and ensuring that fines are collected.

3. Smart infrastructure

Cities would be better able to plan with a smart city's ability to understand vast volumes of data. This will allow for constructive maintenance and better forecasting of future demand. Being able to test the content of lead in water in real time when the data indicate an issue is emerging may avoid public health problems.

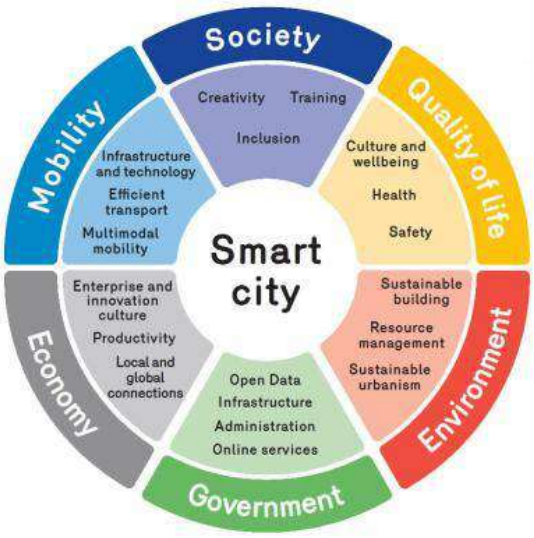


Figure 16 – Smart city infrastructure development

3.4 Road Map and Safe Guards

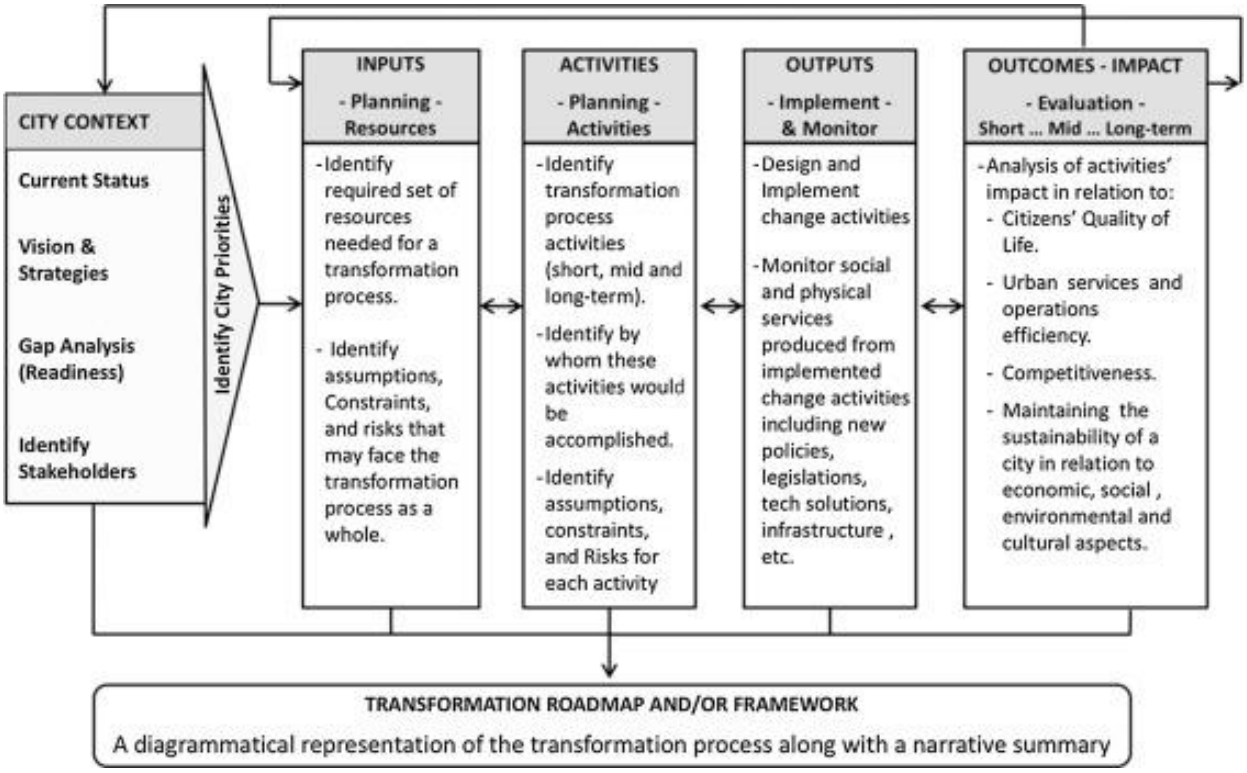


Figure 17 – Roadmap planning and frame work

3.5 Issues & Challenges

The possibility of significant volumes of private sector finance, whether domestic or global, would be a challenge. These problems mean that many projects will not be economically feasible at the start time. The failure of the PPP is mostly due to a lack of practical goals, financial control, project governance and risk management equality. Establishments that help cities handle power, water pollution, traffic flows, municipal operations and public services are becoming more complicated and complex.

Urban water and Sanitation challenges

More than 90% of the urban population has access to drinking water, and more than 60% of the population has access to basic sanitation. However, access to reliable, sustainable, and affordable water supply and sanitation (WSS) service is lagging behind. Are the Services Reliable? No Indian city receives piped water 24 hours a day, 7 days a week. Piped water is never distributed for more than a few hours per day, regardless of the quantity available. Raw sewage often overflows into open drains. Are the Services Technically and Financially Sustainable? Less than 50% urban population has access to piped water. Poor managerial and financial autonomy, limited accountability, weak cost recovery, perverse incentives and limited capacity has led to poor services to customers across the country. Urban India is at the bottom of most international measures of performance.

3.6 Smart Infrastructure - Intelligent Traffic Management

Smart Traffic Management is a system where centrally-controlled traffic signals and sensors regulate the flow of traffic through the city in response to demand. Upgrading and integrating all the signals on the main roads in the city will:

- Reduce everyday congestion markedly, by smoothing traffic flows and prioritizing traffic in response to demand in real time.
- Reduce pollution throughout the city: stop-start driving is inefficient and polluting.
- Give priority to buses approaching junctions, phasing lights to give traffic flowing with buses a 'green wave' through the city.
- Enable a much more effective response to traffic incidents, especially on the A14 and M11. The system can be pre-programmed to handle a sudden increase in traffic on any of the ten radials.
- Enable Inbound Flow Control.

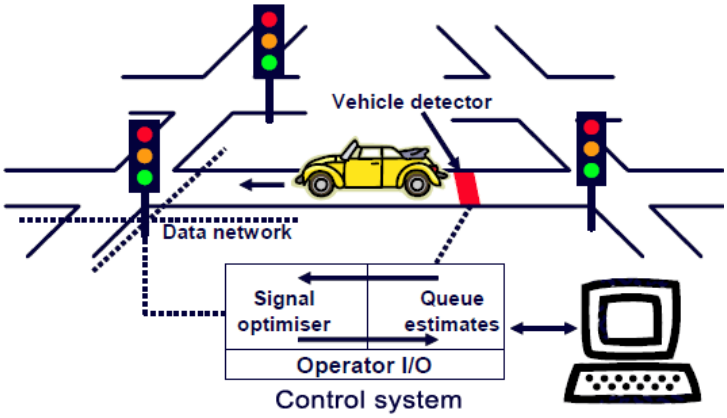


Figure 18 – Smart Traffic Management

3.7 Cyber Security

Cybersecurity is the practice of protecting systems, networks, and programs from digital attacks. These cyber-attacks are usually aimed at accessing, changing, or destroying sensitive information; extorting money from users; or interrupting normal business processes. Cyber security may also be referred to as information technology security. Cyber Security is a body of technology, procedures and practices designed to secure networks, devices, programs and data from threats, harm or unauthorized access. Safety encompasses both cyber security and physical security in a computer sense. Ensuring cyber security needs concerted efforts across the information system.

Elements of cyber security include:

- Application security
- Information security
- Network security
- Disaster recovery / business continuity planning
- Operational security
- End-user education

3.8 Retrofitting- Redevelopment- Greenfield Development District Cooling

Retrofitting

Retrofitting refers to the addition of new technology or features to older systems, for example: power plant retrofit, improving power plant efficiency / increasing output / reducing emissions home energy retrofit, the improving of existing buildings with energy efficiency equipment seismic retrofit, the process of strengthening older buildings in order to make them earthquake-resistant Naval vessels often undergo retrofitting in dry dock to incorporate new technologies, change their operational designation, or compensate for perceived weaknesses in their design or gun plan. Principally retrofitting describes the measures taken in the manufacturing industry to allow new or updated parts to be fitted to old or outdated assemblies (like blades to wind turbines).The production of retrofit parts is necessary in manufacture when the design of a large assembly is changed or revised. If, after the changes have been implemented, a customer (with an old version of the product) wishes to purchase a replacement part then retrofit parts and assembling techniques will have to be used so that the revised parts will fit suitably onto the older assembly.

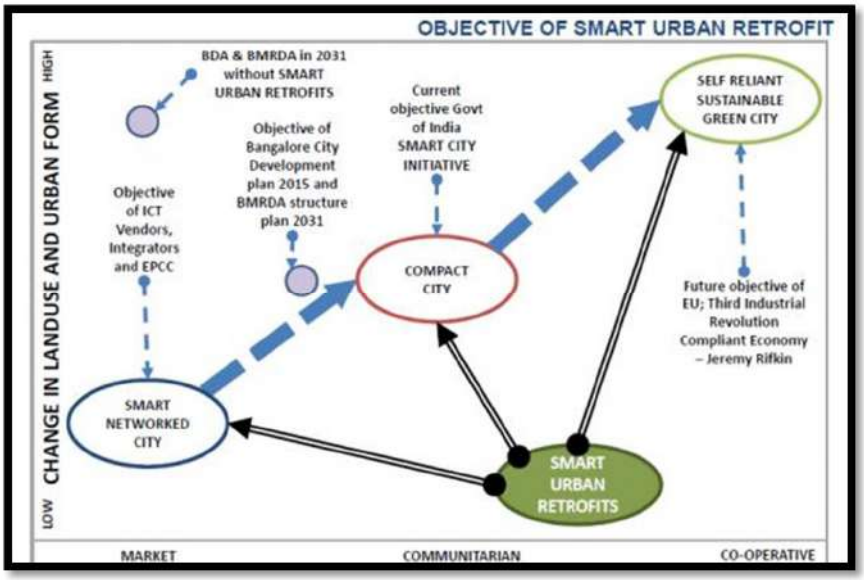


Figure 19 – Smart Urban Retrofitter

Retrofitting is an important process used for valves and actuators to ensure optimal operation of an industrial plant. One example is retrofitting a 3-way valve into a 2-way valve, which results in closing one of the three openings to continue using the valve for certain industrial systems. Retrofitting can improve a machine or system's overall functionality by using advanced and updated equipment and technology—such as integrating Human Machine Interfaces into older factories. Another example of this is car customizing, where older vehicles are fitted with new technologies: power windows, cruise control, remote keyless systems, electric fuel pumps, driverless systems, etc. Trucks and agricultural machines can also be given retrofits to make them driverless. The term is also used in the field of environmental engineering, particularly to describe construction or renovation projects on previously built sites, to improve water quality in nearby streams, rivers or lakes. The concept has also been applied to changing the output mix of energy from power plants to cogeneration in urban areas with a potential for district heating.

Urban resilience through nine popular planning strategies:

(a.) Inventories
(b.) Compact densification
(c.) Scaling
(d.) Functional flexibility
(e.) Fine grain diversity
(f.) Highly connected network
(g.) Synergy
(h.) Greening, water recycling & urban rural integration

Redevelopment

Redevelopment is any new construction on a site that has pre-existing uses. It represents a process of land development uses to revitalize the physical, economic and social fabric of urban space. Variations on redevelopment include: Urban infill on vacant parcels that have no existing activity but were previously developed, especially on Brownfield land, such as the redevelopment of an industrial site into a mixed-use development. Constructing with a denser land usage, such as the redevelopment of a block of townhouses into a large apartment building. Adaptive reuse, where older structures are converted for improved current market use, such as an industrial mill into housing lofts. Redevelopment projects can be small or large ranging from a single building to entire new neighborhoods or "new town in town" projects.

Redevelopment also refers to state and federal statutes which give cities and counties the authority to establish redevelopment agencies and give the agencies the authority to attack problems of urban decay. The fundamental tools of a redevelopment agency include the authority to acquire real property, the power of eminent domain, to develop and sell property without bidding and the authority and responsibility of relocating persons who have interests in the property acquired by the agency. Redevelopment causes the tremendous development in infrastructure by using the mixed land use patterns and also increasing the density at the same time. When the area is more than 50 acres, then for the sake of concerns of citizen’s redevelopment is adopted.

Green Field Development

Greenfield development will introduce most of the Smart Solutions in a previously vacant area using innovative planning, plan financing and plan implementation tools with provision for affordable housing, especially for the poor. Greenfield developments are required around cities in order to address the needs of the expanding population. From a legal perspective, the challenges in obtaining timely, effective, and affordable approvals for Greenfield residential development. In particular, we focus on the constraints on Greenfield developments (not all green fields are equal); the need to integrate land use planning with the provision of infrastructure; and the opportunities provided by the Special Housing Area legislation.

3.9 Strategic Options for Fast Development

Sustainable development means integrating the economic, social and environmental objectives of society, in order to maximize human well-being in the present without compromising the ability of future generations to meet their needs. Some of the steps are below. Three of the main components of this strategic plan include city improvement (retrofitting), city renewal (redevelopment), city extension (green field development) and pan-city development.

Major programs in agriculture

- National agricultural development program
- Accelerated irrigation benefit program
- Fertilizer subsidy
- Bank loans, free electricity

Major program to improve employment

- Public distribution system
- Mahatma Gandhi national rural employment

Guarantee scheme

- National food security bill

Major program and partnerships to improve nutrition security

- Mid-day meal scheme
- Integrated child development scheme(ICDS)
- Senior citizens
- The nutritional program for adolescent girls
- Emergency feeding program

3.10 India's Urban Water and Sanitation Challenges and Role of Indigenous Technologies

India’s urban water and sanitation challenges

In India, virtually all water and waste water systems are currently managed by the public sector, and most fail to meet the needs of the citizens or businesses they serve. Enlisting the private sector in the water sector in the water sector brings finance, reduces waste, and lowers costs when supported by effective governance and transparency. Virtually no single city or utility in India has the capacity to manage a comprehensive programmer to reduce leakages or lost revenues. A number of utilities continue to lose close to 50 per cent of their water to leaky pipes, illegal connections, and unbilled or unpaid for water. Not only is the water itself wasted, so is the energy required to treat and pump the water. By using performance-based management contracts to draw on the technical and managerial skills of the private sector, public utilities can enhance their ability to tackle such operational and maintenance problems and improve service to their customers.

Navi Mumbai near Mumbai has shown how to improve water and sanitation services by using performance-based contracts to manage its water distribution and transmission system. The results are astonishing. Revenues were increased by almost 45 per cent the year following the introduction of the new contracts! The city was also able to reduce unnecessary expenditures over a two-year period the city reduced its annual energy consumption by rs.45 lakh on sewerage contracts alone. Significantly, customer complaints to the utility decreased to almost zero. Performance based contracts allowed the utility not only to provide better service to its customers, but also at lower operational costs.

Role of Indigenous Technology

- Indigenous water purification technologies
- Environment friendly Plasma technologies

- Unique Multi Stage Biological Treatment Solution
- The BARC UF Membrane Technology for Domestic Water Purifiers:
- Radiation Hygienisation of Municipal Sewage Sludge:
- Refuse Derived Fuel: An Emerging Processing Technology in MSWM

3.11 Initiatives in village development by local self-government

The functioning of a Government can be categorized into National, State and Local. Local Self-Governments are those bodies that look after the administration of an area or small community such as village, town or a city. All municipal acts in India provide for functions, powers and responsibilities to be carried out by the municipal government. These are divided into two categories: obligatory and discretionary.

Obligatory functions

- Supply of pure and wholesome water
- Construction and maintenance of public streets
- Lighting and watering of public streets
- Cleaning of public streets, places and sewers
- Regulation of offensive, dangerous or obnoxious trades and callings or practices
- Maintenance or support of public hospitals
- Establishment and maintenance of primary schools
- Registration of births and deaths
- Removing obstructions and projections in public streets, bridges and other places
- Naming streets and numbering houses
- Maintenance of law and public order

Discretionary functions

- Laying out of areas
- Securing or removal of dangerous buildings or places
- Construction and maintenance of public parks, gardens, libraries, museums, rest houses, leper homes, orphanages and rescue homes for women
- Public buildings
- Planting of trees and maintenance of roads
- Housing for low income groups
- Conducting surveys
- Organizing public receptions, public exhibitions, public entertainment
- Provision of transport facilities with the municipality
- Promotion of welfare of municipal employees

3.12 Smart Initiatives by District Municipal Corporation

The National Smart Cities Mission is an urban renewal and refurbishment program of the Government of India with a mission to develop smart cities across the country, making them citizen-friendly and sustainable. Smart Cities Mission envisions developing an area within the cities in the country as model areas based on an area development plan, which is expected to have a rub-off effect on other parts of the city, and nearby cities and towns. Cities will be selected based on the Smart Cities challenge, where cities will compete in a countrywide competition to obtain

the benefits from this mission. As of January 2018, 99 cities have been selected to be upgraded as part of the Smart Cities Mission after they defeated other cities in the challenge. The mission initially included 100 cities, with the deadline for completion of the projects set between 2019 and 2023. The first batch of 20 cities was selected. Known as 20 Lighthouse Cities in the first round of the All India City Challenge competition, they will be provided with central assistance of ₹200 crore (US$28 million) each during this financial year followed by ₹100 crore (US$14 million) per year during the next three years. The Urban Development Ministry had earlier released ₹2 crore (US$280,000) each to mission cities for preparation of Smart City Plans.

3.13 Any Projects contributed working by Government / NGO / Other Digital Country concept

Recently Government project inaugurated by P.M. Narendra Modi in Gujarat.

Surat

- Remodeling & Restructuring of existing creek to create open spaces with smart-200.00 Cr.
- 24 x 7 Water Supply & Water Quality 178.00 Cr.
- Common Utility Meter 17.00Cr.
- Remodelling & Restructuring of existing creek to create open spaces with smart 200.00 Cr.

Ahmedabad

- Green Areas & Open Spaces
- External Utility Network (Water, sewerage, drainage, roads, etc.) 28.00 Cr.
- Wastewater Treatment Plant) 125.00 Cr.
- Residential & Allied Development (including internal utility network) 451.00 Cr.
- Ahmedabad-Mumbai High Speed Rail

NGO list

- Vatsalyapuram Orphanage NGO
- Nature club
- Janki jivdaya charitable trust
- Bhansali trust
- Lions club of surat north
- Shri goverdhan trust
- Disable welfare Trust of India, etc.

Digital country concept

Digital India is a campaign launched by the Government of India in order to ensure the Government's services are made available to citizens electronically by improved online infrastructure and by increasing Internet connectivity or by making the country digitally empowered in the field of technology. The initiative includes plans to connect rural areas with high-speed internet networks. Digital India consists of three core components: the development of secure and stable digital infrastructure, delivering government services digitally, and universal digital literacy, Launched on 1 July 2015 by Indian Prime Minister Narendra Modi, it is both enabler and beneficiary of other key Government of India schemes, such as Bharat Net, Make in India, Startup India and Standup India, industrial corridors, Bharatmala, Sagarmala. As of 31 December 2018, India had a population of 130 crore people (1.3 billion), 123 crore (1.23

billion) Aadhaar digital biometric identity cards, 121 crore (1.21 billion) mobile phones, 44.6 crore (446 million) smart phones, 56 crore (560 million) internet users up from 481 million people (35% of the country's total population) in December 2017, and 51 per cent growth in e-commerce.

3.14 How to implement other Countries smart villages projects in Indian village context

After the Prime Minister Narendra Modi-led government at the Centre announced its plans to develop 100 smart cities, various countries have been lining up to help India achieve the target. While 98 cities have so far been shortlisted to be developed, the names of the other two are to be announced at a later stage. Of those, 20 cities are selected in 2015-16 are to be provided funding in the first phase.

Smart Village initiative: new thinking for off-grid communities worldwide and IEEE Smart Village: Empowering off-grid communities are both worldwide active and striving to meet the SDG 2030, especially goal 7, Affordable and Clean Energy. The first one promotes access to sustainable energy as a main catalyst for the development of good education and healthcare systems, access to clean water, sanitation, economic growth, enhanced security, gender equality, etc. The most important vision of the Initiative is to apply more holistic and integrated approaches to enable the access to the energy in the rural contexts, while connecting/involving governments, developmental and private sector in the process. The component most emphasized is how to connect renewable sources of energy with ICT. The activities of the Initiative are taking place in six large regions, namely East Africa, West Africa, Sustainability 2018, 10, 2559 4 of 14 South Asia, South-East Asia, South America, and Central America, Caribbean, Mexico—the so-called developing world with limited possibilities to access (educational, electrical, economic and other) infrastructure. To find the most suitable solutions, there is a wide range of professionals working on the field and otherwise: villagers, NGOs, development organizations, entrepreneurs, policy makers, engineers, and experts from the field of humanities. Their search for solutions is encompassing and, based on long-term research, analyzing local and regional circumstances, identifying cross-cutting issues and proposing suitable solutions. More than 30 workshops have been organized where more than thousand stakeholders from 70 countries have presented their views and evidence (p. 140). By now, the majority of their activities was funded by Cambridge Malaysian Education and Development Trust and Malaysian Commonwealth Studies Centre. Sweden, Israel, the Netherlands, United Kingdom and Hong Kong have also shown interest in investing in India for developing smart cities.

In order to ensure the success of Smart Village initiative in agriculture there is a need to firstly identify who are the stakeholders and major players for Kg Besting community. This is important as not all are ready to be part of the initiatives due to several reasons such as not having business yet, not involved in farming and agro-based related activities, low motivation and attitude, too old and not interested and also due to the low information and network needs. However, if more time is given to implement the initiatives the change of mindset and attitude is a must for all the community to ensure any projects and incentive injected will be well received and successful.

CHAPTER 4: ABOUT< KUNKNI VILLAGE >

4.1 Introduction – Kunkni Village

4.1.1 Introduction about <KUNKNI> Village details

According to Census 2011 information the location code or village code of Kunkni village is 523781. Kunkni village is located in Olpad Tehsil of Surat district in Gujarat, India. It is situated 18km away from sub-district headquarter Olpad and 16km away from district headquarter Surat. As per 2009 stats, Kunkni village is also a gram panchayat. The total geographical area of village is 237 hectares. Kunkni has a total population of 856 peoples. There are about 169 houses in Kunkni village. As per 2019 stats, Kunkni villages comes under Olpad assembly & Surat parliamentary constituency. Surat is nearest town to Kunkni which is approximately 16km away. Time zone: IST (UTC + 5:30). Elevation / Altitude: 19 meters above Sea level.

4.1.2 Justification/ need of the study

By this project of Vishwakarma Yojana, the government wants a technological solution to the problems of the villages from an engineering point of view. The common problems of the village are solved by engineering students in this project. The basic needs of the rural development programme have been the alleviation of poverty and unemployment through the construction of basic social and economic infrastructure, the provision of training for rural unemployed young people and the provision of jobs for marginal farmers to prevent seasonal and permanent migration to urban areas.

New engineers under Vishwakarma Yojana can provide a holistic view and modern solutions (Aesthetics, Vastushastra, etc.) through various government departments engaged in various infrastructural development works. The village analysis is done by the students with this view. 54% of India's population is under 25 years of age and most of them live in rural areas with very little job opportunities. Literacy is the core concern of the rural development programed.

4.1.3 Study Area

Kunkni is a medium size village located in Olpad Taluka of Surat district, Gujarat with total 169 families residing. The Kunkni village has population of 856 of which 438 are males while 418 are females as per Population Census 2011. In Kunkni village population of children with age 0-6 is 100 which makes up 11.68 % of total population of village. Average Sex Ratio of Kunkni village is 954 which is higher than Gujarat state average of 919. Child Sex Ratio for the Kunkni as per census is 1083, higher than Gujarat average of 890. Kunkni village has higher literacy rate compared to Gujarat. In 2011, literacy rate of Kunkni village was 92.72 % compared to 78.03 % of Gujarat. In Kunkni Male literacy stands at 97.18 % while female literacy rate was 87.98 %.

4.1.4 Objectives of the study

Fulfilling common requirements such as drinking water, irrigation system, transport system, improving people's living standards. To manage growth through good planning and effective controls on production, reduce migration from rural to urban areas due to lack of basic services and adequate economic activity in rural areas. Electricity connections such as street lighting that is energy efficient and environmentally friendly. Health and educational services. To aware the people about their rights and various scheme/policy that is implemented by the government for them in various field like housing scheme, farming related scheme, health related, etc.

4.1.5 Scope of the Study

Design, build and produce more effective and reliable electricity in rural areas to provide better electricity connections in rural areas by making the most of any resource that comes with Creating and Using Sustainable and Economic Planning and Design.

4.1.6 Methodology Frame Work for development of your village

- Collection of Data
- House Hold Information
- Solid Waste Management
- Transportation Data

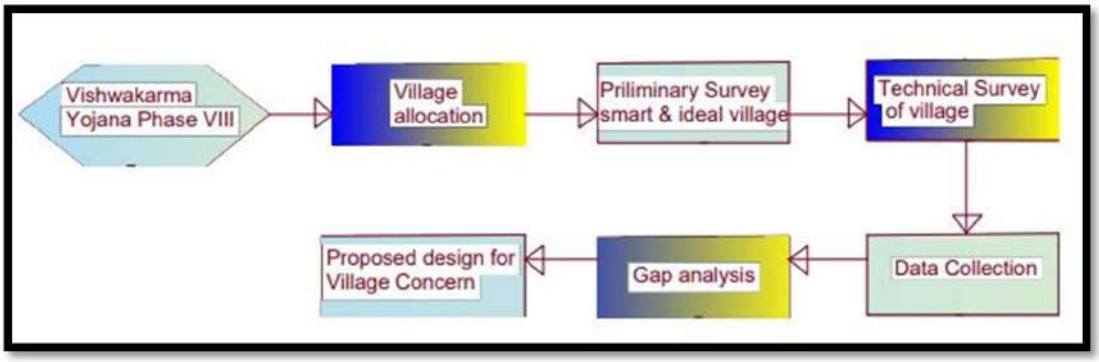


Figure 20 – Methodology for survey of village

4.1.7 List of Objects Available related to Civil Methodology

- Water tank
- Roadways
- Gram panchayat
- Community hall
- Lake
- Canal
- Primary School
- Drainage system
- Cultivable land and method, etc.

4.2 <KUNKNI VILLAGE> Study Area Profile

4.2.1 Study Area Location with brief History land use details

Kunkni is a medium size village located in Olpad Taluka of Surat district, Gujarat with total 169 families residing. The Kunkni village has population of 856 of which 438 are males while 418 are females as per Population Census 2011. In Kunkni village population of children with age 0-6 is 100 which makes up 11.68 % of total population of village. Average Sex Ratio of Kunkni village is 954 which is higher than Gujarat state average of 919. In 2011, literacy rate of Kunkni village was 92.72 % compared to 78.03 % of Gujarat. In Kunkni Male literacy stands at 97.18 % while female literacy rate was 87.98 %.

Figure 21 – Satellite map of village Kunkni

4.2.2 Physical & Demographical Growth

In 2011, literacy rate of Kunkni village was 92.72 % compared to 78.03 % of Gujarat. In Kunkni Male literacy stands at 97.18 % while female literacy rate was 87.98 %.

Table -5 Demographical detail of Kunkni village

Demographics	Census 2011
Population	856
Population density	361 per km^2
Growth of Population	15.5%
Sex Ratio	M-438 F-418
Sex Ratio Child	1083
Literacy Rate	93%
Total No. of House holds	169

4.2.3 Brief history

There were no economic and banking facilities in Kunkni village like, Bank, ATM etc. The main economy of the village & its development is from agriculture and livestock (animal husbandary). The main professions of villagers are farming, Govt. service, and employer. As the people of the village are literate so there is economic condition of the village is stable above poverty line. Hardly of them are below poverty line. Mainly they grow rice, then vegetables and sugarcane. They have primary school in their village up to 8^{th} standard and one private school in the strating of the village.

4.2.4 Economic generation profile / Banks:

There is no bank in the village. The population of the village is small the bank facility is not provided they have their account in nearby banks available within 4-5 km. in another village or town.

4.2.5 Actual Problem faced by Villagers and smart solution:

Owing to a shortage of resources, such as schooling, health care, sustainable development projects and economic facilities. People are not getting jobs in the village and because of inadequate educational facilities, people are moving from the village to other cities.
The provision of basic infrastructure services such as schools, colleges, water harvesting systems, ATMs, banks, post offices, sewage system, solid waste disposal and the provision of scope of work. This will help to alleviate the issues facing the villagers.

Social scenario: In social infrastructure health and education facilities are provided to ensure the proper delivery of facilities to village dwellers.

Educational facilities: Primary school -1 to 8 standards only, No Higher secondary school, No College is there.

Health facilities: Primary health center is not there (under Ayushman Bharat Yojana)

4.2.6 Social scenario -Preservation of traditions, Festivals, Cuisine

Traditions: Marriage songs (lagan geet).

Festivals: All the Hindu festival, Garba, Diwali, etc.

Cuisine: Bafanu, Pickle, Seasonal food, etc.

4.2.7 Migration Reasons / Trends

Due to lack of resources such as education, health care, sustainable development projects and economic facilities. People are not getting jobs in the area, and because of inadequate educational facilities, people are moving from the village to other cities. Many other facilities are that the town has in it as per the more population and people residing, nearby industrial area and facilities, recreation center, etc.

4.3. Data Collection

4.3.1 Methods for data collection

- Direct communication
- Websites
- Communication with villagers
- Views of Sarpanch
- Detail from sarpanch
- Self-observation

4.3.2 Primary survey details

- Health care center - not there (under Ayushman Bharat Yojna)
- Primary school - Standards – from 1 to 8, Well hygiene and clean
- Irrigation water - canal (water is pumped out)
- Milk dairy building - 25% of the milk production.
- Community hall – existing condition and it use
- Construction of road – under various scheme and political parties.

4.3.3 Average size of the House

Approximate 15ft * 45ft, 12ft * 30ft, etc. depends on the landlord and the size of area it has. Geo-Tagging of House: 10% of the house are only left to build. Which contain shed and lower people houses (i.e. workers).

Figure 22 – Housing

4.3.4 No of Human being in One House

Approx. 4 to 5 in each house, and if the house is a joint family, the member's no more than8, 10, etc.

4.3.5 Material available locally in the village and Material out Sourced by the villagers

Material used locally: cow dung, cement concrete, brick work, wood. No material out scoured.

4.3.6 Geographical Detail

Table – 6 Geographical Detail

Particulars	Total	Male	Female
Total No. of Houses	169	-	-
Population	856	438	418
Child (0-6)	100	48	52
Schedule Caste	0	0	0
Schedule Tribe	20	14	6
Literacy	92.72%	97.18%	87.98%
Total Workers	321	274	47
Main Worker	320	-	-
Marginal Worker	1	0	1

4.3.7 Demographical Detail - Cast Wise Population Details / Which ID proof using by villagers

Schedule Tribe (ST) constitutes 2.34 % of total population in Kunkni village. There is no population of Schedule Caste (SC) in Kunkni village of Surat. In Kunkni village out of total population, 321 were engaged in work activities. 99.69 % of workers describe their work as Main

Work (Employment or Earning more than 6 Months) while 0.31 % were involved in Marginal activity providing livelihood for less than 6 months. Of 321 workers engaged in Main Work, 134 were cultivators (owner or co-owner) while 51 were Agricultural laborer.

4.3.8 Occupational Detail - Occupation wise Details / Majority business

Table – 7 Occupation Detail	
Name of Three Major Occupation groups in village	Agriculture Job (in town/city)
Major crops grown in the village	Paddy Vegetables Sugarcane Wheat

4.3.9Agricultural Details / Organic Farming / Fishery

No fish farming is done. They cultivate rice sugarcane, vegetables. Their main profession is agriculture and milk production.

4.3.10 Physical Infrastructure Facilities - Manufacturing HUB / Ware Houses

Ware houses / manufacturing HUB - Not available as the population is less in the village and some are available in nearby village.

4.3.11 Tourism development available in the village for attracting the tourist

No such place and structure is available there.

4.4 Infrastructure Details

4.4.1 Drinking Water / Water Management Facilities

Domestic water supply through the Government. Supply, for agricultural use through the canal, and during shortage or breakdown in the Government. Supply used from the overhead water tank.

4.4.2 Drainage Network / Sanitation Facilities

Partly provided drainage facility i.e. 50% of the house are given drainage facility and 50% are remaining. And they have open drainage which flow through underground and directly released to the canal or near village. The available drainage is shown in fig.23.

4.4.3 Transportation & Road Network

Road is divided in 3 different part i.e. cement concrete road, bitumen road, and block. The construction of road is done under various political parties and scheme. So for the different lane in the area of village road type is vary as shown in fig.24.

4.4.4 Housing condition

The house of the whole village is built by the Government Under different schemes or according to the needs of the residents, i.e. 10 per cent of the kachha and 90 percent of the pucca.

Figure 23 – Drainage Condition

Figure 24 – Road of Kunkni Village

4.4.5 Social Infrastructure facilities, Health, Education, Community Hall, Library

Only the community hall and school is there and which are in working condition. As the population is less and the people of the village are not aware of their basics amenities right in the village.

Table – 8 Infrastructure Facilities

Infrastructure facilities	Details
Health	No PHC
Education	1 Primary school
Community Hall	Without Television and washrooms
Library	No

4.4.6 Existing Condition of Public Buildings &Maintenance of existing Public

No public building is there in village except school, community hall, dudh mandli, panchayat building and temple.

Figure 25 – Community Hall

4.4.7 Technology mobile / WIFI/ Internet. Usage details in %

70% as per connectivity technology is used and gadget's. There is no Wi-Fi facilities available in village. So they used mobile data only.

4.4.8 Sports Activity as Gram Panchayat

No such activities are played in the village, but volleyball and cricket are played during winter or in free time.

4.4.9 Socio-Cultural Facilities, Public Garden /Park/Playground /Pond/ Other Recreation Facilities

Lake and temple creating aesthetic and beautiful view (recreation) center of the village, rater no such place or structure is there.

Figure 26 – Lake

Figure 27 – Temple

4.4.10 Other Facilities - No

4.4.11 Any other details – No

4.5 Electrical Concept - Existing Institution like - Village Administration – Detail Profile

4.5.1 Renewable energy source planning particularly for villages

No such facility available-required for the planning of Bio gas plant and solar plant, street light.

4.5.2 Irrigation Facilities

Water supply to the field is done through canal and pumping units. Lake water is also used when there is shortage of water is their or no govt. supply is there. As shown in fig.28

4.5.3 Electricity facilities with Area

100% available i.e. the electricity available is of GEB (Gujrat Electricity Board). Available 24*7 and for irrigation purpose also, the power breakdown is there once a week for a day or 5-6 hr. only. As shown in fig.29.

Table – 9 Electricity Facilities					
Sr. No	**Description (Electricity Distribution)**	**Information/ Details**	**Adequate**	**Inadequate**	**Remarks**
1.	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	GEB (24 hrs)	Yes		
2.	Power supply or Domestic Use	24 hrs	Yes		
	Power supply for Agricultural Use	24 hrs	Yes		
	Power supply for Commercial Use		No		
	Road/ Street Lights	Street light	Yes		5% solar street available
3.	Electrification in Government Buildings/ Schools/ Hospitals	School only			
4.	Renewable Energy Source Facilities (Y/ N)	No Govt. plant	No		Privately setup & used only
5.	LED Facilities	Not available	No		

Figure 28 – Canal of Kunkni Village

Figure 29 – Electricity Distribution

4.6 Existing Institution like - Village Administration – Detail Profile

4.6.1 Bachat Mandali

Not developed yet developed. As there is village population I small and the people engage in agriculture activities are less, because the youth of the village are partly engage in job and agriculture activities.

4.6.2 Dudh Mandali

The milk society or the committee of the village is there but the building is not in the working condition. Previously it is used by the panchayat.

Figure 30 – Milk Community

4.6.3 Mahila forum (mandali)

Yes, as the female literacy ratio is also high and the females are also working so the mahila mandala is there but not much in implement if it is serious problem then only it is in use.

4.6.4 Plantation for the Air Pollution

Yes, the tree plantation and the plant are plant or sown in the village by the students and others. They celebrate the day as “VRUKSHA ROPAN”

4.6.5 Rain Water Harvesting

Not there; as the water available is in enough quantity and the supply from the government is also regularly.

4.6.6 Agricultural Development

For Increase in productivity of crops people are using traditional methods for the agricultural.

4.6.7 Any other detail

There is no other information or much detail is there as the village is small.

CHAPTER 5. TECHNICAL OPTIONS WITH CASE STUDIES

5.1 Concept (Civil)

5.1.1 Advance Sustainable construction techniques / Practices and Quantity Surveying

5 Techniques for Sustainable Building Construction: For contractors, a strategy for saving time and materials can lead to higher profitability and the good feeling of not creating unnecessary waste. Here's a look at five techniques that are having the greatest impact on sustainable building construction.

1. Prefabricating Materials in Controlled Environments

Constructing as much of a structure in a controlled environment as possible has improved the quality of buildings and resulted in less trash, says Spencer Finest, principal of Minneapolis-based Greiner Construction. Being able to cut materials precisely decreases waste and creates buildings that are strong enough to allow contractors to use wood framing as high as five stories, he says. Mechanical contractors use Building Information Management (BIM) systems to cut sheet metal for duct work in a controlled environment instead of outside to avoid the shape-changing problems caused by cold or hot weather, according to Mike Smoczyk, director of professional development for Minneapolis-based Kraus-Anderson. That same duct work is delivered to a project "wrapped and sealed tightly and kept out of the elements" to avoid damage, he says. He estimates that prefabrication probably accounts for 15% of any project and likely more for hotels.

Roseville-based Mc Gough Construction is prefabricating forms for use in creating the concrete superstructure of the $39 million, 57,000-sq.-ft. addition for the Ordway Center for Performing Arts addition in downtown St. Paul, according to Dan Brenteson, Mc Gough's lean enterprise system director. Mc Gough first creates 3D models then pre-builds forms at its White Bear Lake warehouse, a much better environment than being outside at a work site exposed to the elements and "in a constrained environment," he says.

The resulting forms are then transported — in this case to the Ordway site — where concrete is poured into them and the pieces are assembled in an Erector Set-style fashion. It's a common practice for Mc Gough that saves time and improves quality because the planning and assembly of formwork were done in a warehouse with access to equipment not readily available on tight jobsites, such as the Ordway, Brenteson states.

2. Construction Waste Management

Reducing waste is becoming more achievable for contractors as haulers have grown more sophisticated in recent years. Where jobsites once had trash bins for different types of waste, they now need just one, in many cases, because haulers use pickers to separate materials. "Through haulers, we can achieve 75% landfill avoidance through their process and we don't need to separate materials to do it," says Dale Forsberg, president of St. Louis Park-based Watson-Forsberg. "On a couple of sites, we've hit 95%."

For inner city projects with small footprints, having haulers handle materials in a single container makes all the difference because space is at a premium, Forsberg says. Some materials are recyclable on site — in particular, concrete that can be crushed and used for foundations or as aggregate beneath parking lots. The three largest construction projects underway in the Twin Cities all have a recycling rate of more than 90%, according to Zachary Hansen, environmental health

director, St. Paul-Ramsey County Public Health department, speaking at a recent conference sponsored by the Minneapolis-based Environmental Initiative. The projects include the Vikings Stadium in Minneapolis, the St. Paul Saints Ballpark and the Ford plant in St. Paul.

3. Managing the Site for Improved Environment

Stormwater pollution prevention has become a "big deal" to municipalities and the state and federal government, says Smoczyk at Kraus-Anderson. "Municipalities do not want a [construction] development that dumps a bunch of bad water into the storm sewer system and overflows it," he says. Runoff is now contained by silt fencing surrounding an area. A number of "best practice" approaches can be used to treat water on site and avoid having it flow into the local sewer system, Smoczyk says.

Kraus-Anderson is now making plans to avoid runoff during construction of its new office building in downtown Minneapolis. Forsberg says worker safety has led to restrictions and the institution of simple ways to reduce pollution. There's no smoking on the site, for example. When workers enter a building, they travel over "walk-off mats" that remove dirt, lead and other potentially dangerous chemicals from their shoes. Contractors also bring recycling containers for food to decrease organic waste.

4. Lean Manufacturing to Reduce Energy

McGough's Brenteson says his company encourages rethinking construction approaches through lean thinking. "It's finding the wasteful activities we're doing and eliminating them," he explains. One success involved a McGough employee who modified a brush that works in conjunction with snow blowers to reduce the amount of time required to clean metal floor decks in winter. The process begins with a brush-mounted snow blower — again, modified a bit by McGough — that takes off the majority of the snow. Then, workers used brushes mounted on broom handles to remove snow caught in the grooves of the metal decks.

Although a snow-shoveling brush might not seem like a big deal, it has made life easier for McGough's staff. "It saved a substantial amount of time and manpower and that's important when talking about waste and sustainability," says Brenteson. McGough also uses tool sheds — all designed by tradespeople — that are organized the same way regardless of the work site. The system eliminates wasted time searching for the right drill bit or wrench. Fewer tools are lost and have to be replaced using the system, and contractors work more efficiently since they can find what they need, says Brenteson. The company was so proud of both approaches it made YouTube videos — one on the snow brush and the other on tool sheds — to showcase them.

LEED doesn't give contractors points for lean construction techniques, but many contractors use them anyway. Ted Beckman of RJM Construction in Minneapolis, says his company sits down with foremen from various subcontractors to share schedules so "everyone knows what they're responsible for." The materials are delivered "just in time" to avoid having rebar and other materials sitting outside well before installation. The just-in-time system brings supplies on or around the day they are needed, Beckman says. "It saves time, eliminates theft on the jobsite, eliminates damage, eliminates wasted time moving things," he adds. "Those are lean practices but they are sustainable things, too, in a sense."

5. Material Selection

Architects and clients seeking LEED can achieve many points by selecting materials manufactured from recycled products and from local sources. The materials can be anything, from renewable

products such as bamboo for floors, to wood from vendors approved by the Minneapolis-based Forest Stewardship Council LEED points are also available for installing water-saving dual-flush toilets and low-flow faucets and other features, says Smoczyk. Water reduction has become a major issue, even in the Land of 10,000 Lakes, he notes. As buildings become greener, so do construction sites. Off-site fabrication, improved on-site maintenance, lean practices, landfill avoidance and green materials acquisition have begun to fundamentally, albeit slowly, transform the way buildings are constructed today.

Figure 31 – Construction Technique

Figure 32 – Construction Practice

5.1.2 Soil Liquefaction

Soil liquefaction occurs when a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress such as shaking during an earthquake or other sudden change in stress condition, in which material that is ordinarily a solid behaves like a liquid. Soil liquefaction occurs when the effective stress (shear strength) of soil is reduced to essentially zero. This may be initiated by either monotonic loading (i.e. a single, sudden occurrence of a change in stress – examples include an increase in load on an embankment or sudden loss of toe support) or cyclic loading (i.e. repeated changes in stress condition – examples include wave loading or earthquake shaking). In both cases a soil in a saturated loose state, and one which may generate significant pore water pressure on a change in load are the most likely to liquefy. This is because loose soil has the tendency to compress when sheared, generating large excess pore water pressure as load is transferred from the soil skeleton to adjacent pore water during undrained loading. As pore water pressure rises, a progressive loss of strength of the soil occurs as effective stress is reduced. Liquefaction is more likely to occur in sandy or non-plastic silty soils, but may in rare cases occur in gravels and clays.

Methods to reduce damage due to soil Liquefaction:

1) By avoiding construction on saturated soils: Soil study must be conducted before construction to check whether the soil is durable for construction. Soil mapping must be made mandatory.
2) Liquefaction-proof structural system
3) Improving Soil Conditions

Methods to mitigate soil liquefaction have been designed to improve soil strength and quality. Methods such as Vibro compaction, dynamic compaction, and use of vibro stone columns are preferable.

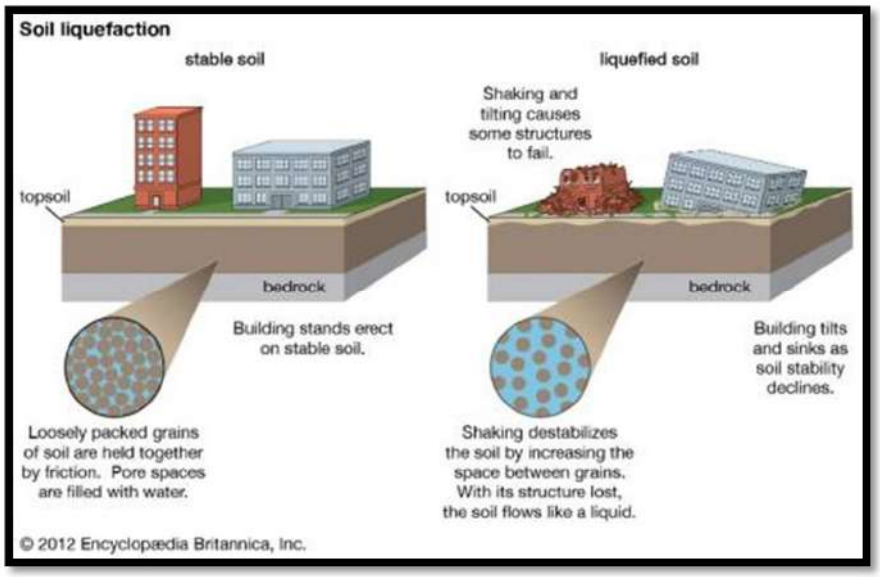


Figure 33 – Soil Liquefaction

5.1.3 Sustainable Sanitation

Sustainable sanitation is a sanitation system designed to meet certain criteria and to work well over the long-term. Sustainable sanitation systems consider the entire "sanitation value chain", from the experience of the user, excreta and wastewater collection methods, transportation or conveyance of waste, treatment, and reuse or disposal. To summarize, sustainable sanitation is a simple approach: the most basic principle is that it considers wastewater and excreta not as a waste, but as a resource, that sanitation has to be socially acceptable and should be as economically viable as possible.

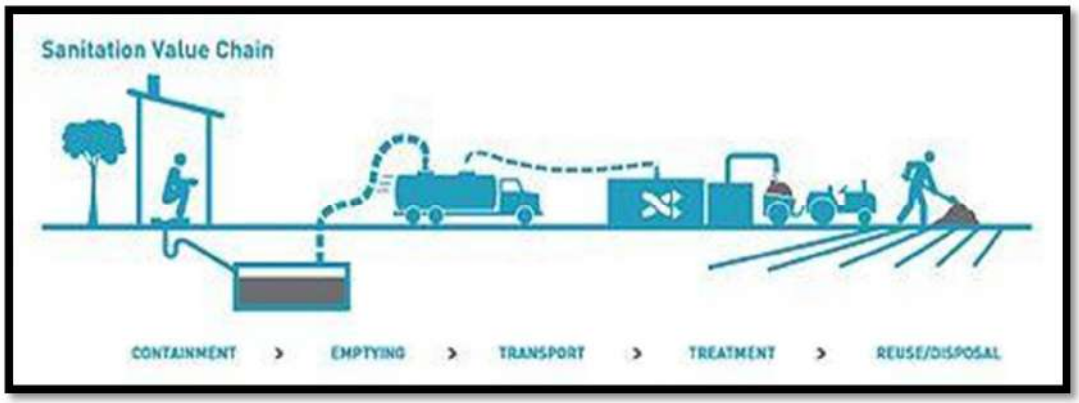


Figure 34 – Sustainable Sanitation

5.1.4 Transport Infrastructure / system

Transport infrastructure consists of the fixed installations, including roads, railways, airways, waterways, canals and pipelines and terminals such as airports, railway stations, bus stations, warehouses, trucking terminals, refueling depots (including fueling docks and fuel stations) and seaports. Terminals may be used both for interchange of passengers and cargo and for

maintenance. Transport infrastructure is one of the most important factors for a country's progress. It has been proven by so many instances how transport infrastructure has added speed and efficiency to a country's progress. Good physical connectivity in the urban and rural areas is essential for economic growth.

Highlights about the investments in transport sector in India:

Among roads, railways, airports and ports, the share of investment is 36%. If we include the other investments, it is likely to exceed 40%. In an overall sense, the transport infrastructure is the most significant investment in the NIP.

• About 20% (Rs. 19.5 lakh crore) of the total NIP investment is expected to take place during 2020-21. Towards this, the central budget has allocated Rs. 1.7 lakh crore for the transport ministries and Rs. 0.4 lakh crore for urban transport (Rs. 0.2 lakh crore) and rural roads (Rs. 0,2 lakh crore).

• The balance would come from internal accruals, borrowings, state funding and private funding.

• To ensure that such a funds flow happens, it is important that the policy direction is sustainable, and the use of funds is efficient.

• In the roads sector, the policy thrust is on increased categorization of national highways (from the current 1.3 lakh kms to 2.0 lakh kms), building expressways, increased use of electronic tolling and advanced technologies for traffic control.

• The Delhi-Mumbai expressway is getting immediate attention as also another 13,000 kms of upgradation of highways. This sector has experimented with different forms of PPPs, including Build Operate Transfer (BOT), Hybrid Annuity Model (HAM) and Toll Operate Transfer (TOT), enabling more projects to be undertaken.

Figure 35 – Bridge

Figure 36 – Urban Transportation

5.1.5 Vertical Farming

Vertical farming is the practice of growing crops in vertically stacked layers. It also involves controlled-environmental agriculture, which aims at maximizing plant growth, and soilless farming techniques such as hydroponics, aquaponics and aeroponics. Some common choices of structures to house vertical farming systems include houses, shipping containers, tunnels and abandoned mine shafts. As of 2020, there is an equivalent of approximately 30 hectares (74 acres)

of vertical farmland in operation. The main advantage of utilizing vertical farming technologies is the increased crop yield that comes with a smaller unit area of land requirement. The increased ability to cultivate a larger variety of crops at once because crops do not share the same plots of land while growing is another sought-after advantage. Additionally, crops are resistant to weather disruptions because of their placement indoors, meaning less crops lost to extreme or unexpected weather occurrences. Because of its limited land usage, vertical farming is less disruptive to the native plants and animals, leading to further conservation of the local flora and fauna.

Technique of vertical farming

- Hydroponics
- Aquaponics
- Aeroponics
- Controlled-environment agriculture

Types of vertical farming

- Building-based vertical farms
- Shipping-container vertical farms
- Deep farms

Figure 37 – Vertical Farming of Lattice Leaf

Figure 38 – Aeroponics

5.1.6 Corrosion Mechanism, Prevention & Repair Measures of RCC Structure

The compressive strength of concrete decreases with the addition of inhibitors as observed at various curing intervals. However, with the increase in curing period the difference in compressive strength of inhibited concrete and blank sample (without inhibitor) reduces. The size of voids in the samples of inhibited concrete is smaller in comparison to blank samples (without inhibitor). With the use of corrosion inhibitor the setting time of cement increased as compared to the blank sample (without inhibitor). It is observed that water demand increases and rate of gain of early

strength decreases in proportion to the amount of pozzolan increases. It has been amply demonstrated that the best pozzolans in optimum proportions mixed with Portland cement improves many qualities of concrete, such as: lower the heat of hydration and thermal shrinkage, increases the water tightness, reduce the alkali-aggregate reaction; improve resistance to attack by sulphate soils and sea water, improve extensibility, lower susceptibility to dissolution and leaching and improve workability. Concrete containing micro silica showed outstanding characteristics in the development of strength, improvement in durability of concrete. With regard to whether or not, silica fume is effective for alkali aggregate reaction, some research worker report that it is effective, other conclude that while it is effective, addition of silica fume in small quantity increases expansion.

Figure 39 – Corrosion of RCC Structure

5.1.7 Sewage treatment plant

Sewage treatment is a process to remove contaminants from municipal wastewater, consisting mainly of household wastewater plus some industrial wastewater. Physical, chemical and biological processes are used to remove contaminants and to produce treated wastewater (or treated effluent) that is safe enough for release into the environment. The treatment of wastewater is part of the overarching field of sanitation. Sanitation also includes the management of human waste and solid waste as well as storm water (drainage) management. The main by-product from wastewater treatment plants is sewage sludge which is usually treated in the same or another wastewater treatment plant. Biogas can be another by-product if anaerobic treatment processes are used. Sewage treatment generally involves three stages, called primary, secondary and tertiary treatment.

Primary treatment consists of temporarily holding the sewage in a quiescent basin where heavy solids can settle to the bottom while oil, grease and lighter solids float to the surface. The settled and floating materials are removed and the remaining liquid may be discharged or subjected to secondary treatment. Some sewage treatment plants that are connected to a combined sewer system have a bypass arrangement after the primary treatment unit. This means that during very heavy rainfall events, the secondary and tertiary treatment systems can be bypassed to protect them from hydraulic overloading, and the mixture of sewage and storm water only receives primary treatment.

Secondary treatment removes dissolved and suspended biological matter. Secondary treatment is typically performed by indigenous, water-borne micro-organisms in a managed habitat. Secondary treatment may require a separation process to remove the micro-organisms from the treated water prior to discharge or tertiary treatment.

Tertiary treatment is sometimes defined as anything more than primary and secondary treatment in order to allow ejection into a highly sensitive or fragile ecosystem (estuaries, low-flow Rivers, coral reefs). Treated water is sometimes disinfected chemically or physically (for example, by lagoons and microfiltration) prior to discharge into a stream, river, bay, lagoon or wetland, or it can be used for the irrigation of a golf course, greenway or park. If it is sufficiently clean, it can also be used for groundwater recharge or agricultural purposes.

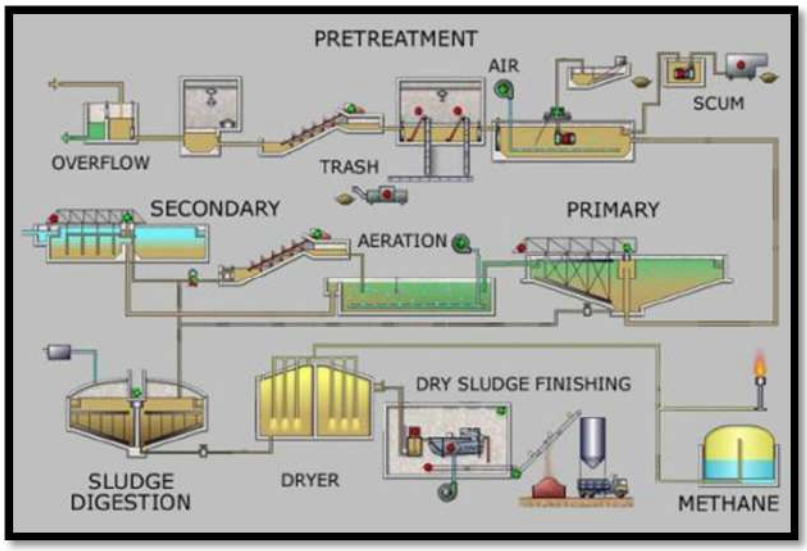


Figure 40 – Pretreatment

5.1.8 Technical case study on "Pandit Dindayal Upadhyay'' cable stayed bridge

Cable Bridge, Surat or Pandit Dindayal Upadhyay Bridge is a cable-stayed bridge over the Tapti River that connects the Athwa and Adajan areas of Surat, India. The bridge is named after Indian politician and thinker Deendayal Upadhyaya. A connected 3-way interchange flyover bridge was constructed on the Athwa side to facilitate easy flow of traffic. The construction of a new bridge over the Tapti River at Athwa was proposed in 2006. S. N. Bhobe and Associates, Navi Mumbai, was selected as the designer for both of the bridges in 2008. S. N. Bhobe and Associates has been designing projects for the Surat Municipal Corporation (SMC) since 2006. The same company previously designed the Fly Over Bridge at Nana Varachha junction, Fly Over Bridge at Kapodra Fire Station junction, Hajira - Adajan Flyover Bridge and Shri Swami Dayanand Saraswati Bridge across the Tapti River for SMC.

Construction work for the cable-stayed bridge started in 2010. The construction this portion of the bridge (River-Bridge) was contracted to Gammon India and the connected 3-way interchange flyover bridge on the Athwa side of the main river bridge was contracted to Rachana Construction. Spectrum Techno Consultant Private Limited was appointed as Project Manager Consultant to supervise the entire construction work and to ensure that the construction was taking place as per standards.

Figure 41 – Pandit Dindayal Upadhyay - Cable Stayed Bridge

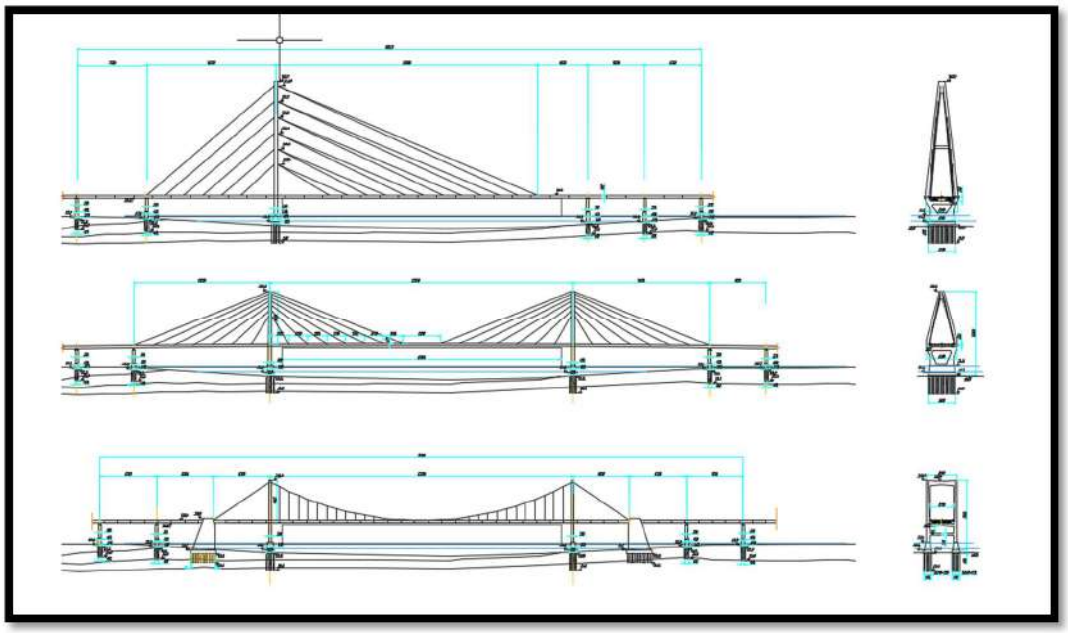


Figure 42 – Plan, Cross-Section, Elevation of Cable Stayed Bridge (from google)

Table – 10 Cable Bridge Surat (from google)	
Coordinates	21°10′55.7″N 72°47′45.2″ECoordinates: 21°10′55.7″N 72°47′45.2″E
Crosses	Tapti
Locale	Athwa - Adajan, Surat, Gujarat, India
Begins	2 October, 2018
Official name	Pandit Dindayal Upadhyay Bridge
Owner	Surat_Municipal_Corporation

Characteristics	
Design	High Level Cable-stayed bridge
Material	Sub Structure - R.C.C. Pier
Trough construction	Super Structure - Segmental Multi cell Box Girder/ PSC Box Girder / Solid Slab type
Total length	918 metres (3,012 ft)
Width	23.5 metres (77 ft)
Longest span	150 metres (490 ft)
No. of spans	15
Piers in water	7
Clearance below	23.5 metres (77 ft) (From high flow level)
No. of lanes	4
History	
Contracted lead designer	Before Incident - S. N. Bhobe and Associates After incident - L & T Infra Engineering
Constructed by	Sarted - Gammon India, Balance Portion - Unique Construction Surat
Construction start	2010
Construction end	2018
Construction cost	Rs. 143.65 Crore
Inaugurated	2 October, 2018

5.2 Concept (Electrical)

5.2.1 Programmable Load Shedding

Programmable load shedding time management system is a reliable circuit that takes over the manual task of switch ON/OFF the electrical devices with respect to time. It uses real time clock (RTC) interfaced to a microcontroller of 8051 family. Multiple ON/OFF time entry is the biggest advantage with this project. In today's world, there is a continuous need for automatic appliances with the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life. The project is designed to operate an electrical load multiple number of times as per the program. It overcomes the difficulties of switching the load ON/OFF manually. This proposed has an inbuilt real time clock (RTC) to keep tracking the time and thus to switch ON/OFF the load accordingly. Load shedding is what electric utilities do when there is a huge demand for electricity that exceeds the supply. Thus in a distribution system it needs to be precisely controlled for specific period of time. Programmable load shedding time management system is a reliable circuit that takes over the manual task of switch ON/OFF the electrical devices with respect to time. It uses real time clock (RTC) interfaced to a microcontroller of 8051 family. While the set time equals to the real time, then microcontroller gives command to the corresponding relay to turn ON the load and then another command to switch OFF as per the program. Multiple ON/OFF time entry is the biggest advantage with this project. A matrix keypad helps to enter the time.

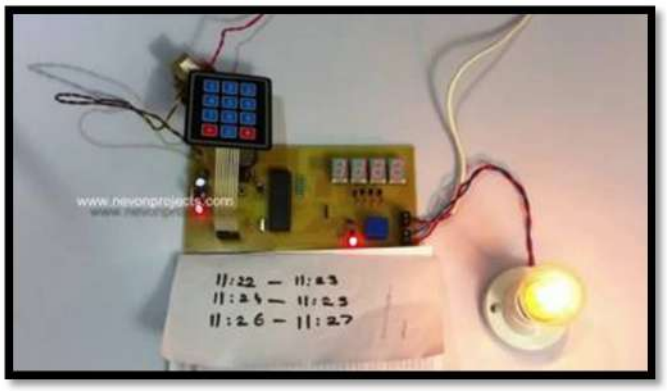


Figure 43 – Load Shedding

5.2.2 Railway Security System using IoT

Railways is considered as one of the widely spread mode of transportation all over the globe. Nowadays there is an enormous increase in road and railway traffic. This rapid growth has given rise to more and more accidents at the level crossings. This is a serious concern for both railway and road traffic users. There are no easy ways for tackling this problem, but the main concern is regarding its feasibility for the fluctuating environmental conditions. In this paper, we are proposing an IoT based technique as an alternative and efficient solution for manned and unmanned level crossings. To implement this technology, we are fixing two Infrared Sensors at a pre-calculated distance to calculate the speed of train and time taken by the train to reach level crossings. With this data we are trying to automate closing and opening of gates at level crossings and to regulate road traffic users waiting time. This real time information is sent to database server with the help of Wi-Fi module through Internet of Things (IoT). With the help of GSM module, we send the intrusion detection information to the concerned train driver, station master and control room for efficient monitoring.

5.2.3 Management through Energy Harvesting Concept

The objective of the Power Management through Energy Harvesting Concept project work has been designed and implemented in the power management through energy by harvesting concept which deals with the power saving and optimization. The overall control is based on sensors of light and temperature. After installing the components the process becomes automatic. If a load at a particular zone is increased then the control will trip. To overcome these drawbacks we have designed and implemented the circuit.

The objective is to minimize the cost of supplied power to the load point. A vertical-axis wind turbines (VAWT) is a type of wind turbine where the main rotor shaft is set transverse to the wind (but not necessarily vertically) while the main components are located at the base of the turbine. This arrangement allows the generator and gearbox to be located close to the ground, facilitating service and repair. A vertical axis wind turbine has its axis perpendicular to the wind streamlines and vertical to the ground. A wind turbine airfoil works in the same way as an airplane wing. The air passing over the airfoils (wind turbine blades) are converted into rotational momentum which spins the generator. This can come up in various ranges from 1 lakh to 1.7 lakh Indian rupees, depending upon the configuration and specifications of the designed model.

5.2.4 Moisture Monitoring System

Introduction

Planting a tree in an environment where the seed or the plant would not get water adequately through natural sources like rain or ground water in its initial phases has been always a matter of concern for tree planters. This is where an autonomous moisture monitor for plants system can help.

Figure 44 – Moisture Monitor for Plants

Hardware:-

Water Sensor Buzzer, Resistors, Capacitors, Transistors, Cables and Connectors, Diodes, PCB and Breadboards LED, Transformer/Adapter, Push Buttons, Switch IC, IC-CD4060, Sockets. Fig. 44

Working

The system timely monitors the moisture level of the soil. If at the time of monitoring it comes to know that the moisture level of the soil is lower than recommended then it will raise an audio visual alert. This alert is then received by the care taker of the plant. When the care taker waters the plant the alarm goes off and the monitoring cycle continues. In this system we use a timer IC to time the monitoring process. A moisture level sensor is used to detect the moisture level of the soil. An LED is used to give visual alarm and a Buzzer is used to give audio alarm to the care taker of the plant. Thus in this project with the help of a simple combinational circuit and a sensor we can help save a plant by maintaining the moisture level of the soil of the plant, thus keeping the plant healthy.

Application

The sensor which measures water content in a soil is known as moisture sensor. A probe contains multiple such sensors. It helps in managing irrigation systems more effectively and efficiently. It helps farmers to save water, to increase yields and to increase quality of the crop.

Cost: - The actual cost of moisture monitoring system 5000 to 10000 Indian rupee.

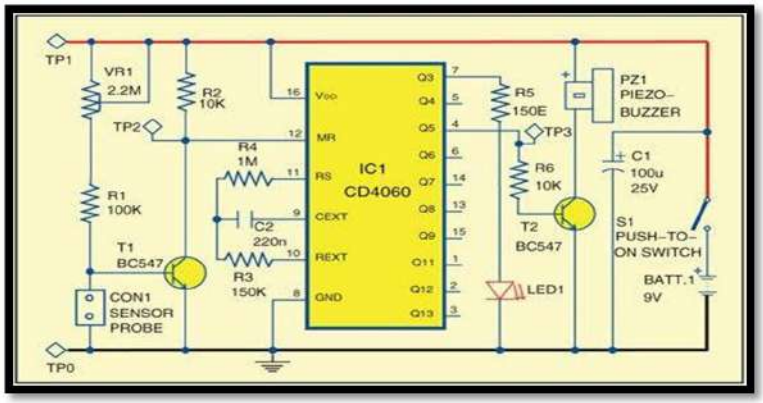


Figure 45 - Circuit diagram Moisture monitoring system

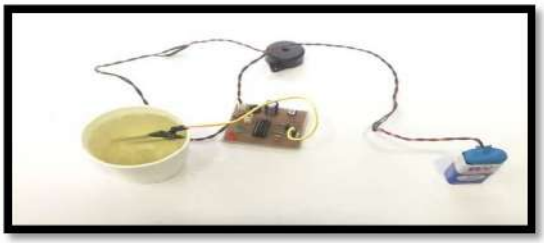


Figure 46 - Prototype design of moisture monitoring

CHAPTER 6. SWACHH BHARAT ABHIYAN (CLEAN INDIA)

6.1 Swachhta needed in allocated village -Existing Situation with photograph

Sanitation: As there is a shortage of accessible toilets that establish a non-hygienic atmosphere in the village. Cleanliness must be ensured and proper sullage collecting pipeline facilities must be provided for public.

Drainage facility: As we know, if we've got excess or standing water, it can choke our crops. Drainage decreases soil and nutrient loss from runoff and scour that near part of land. Open drain is there in which all the waste water from the houses is collected or drown off; which then floe=w and added into the canal water.

Figure 47 – Existing open drainage

6.2 Guidelines - Implementation in allocated village

Creation of local environmental protection initiatives. Facilitate the involvement of local governments in strengthening water and sanitation management. Both open drains should be properly sealed. Under Swachh Bbharat Abhiyan guidelines for cleanliness of the dust, from the road nearby houses, school, etc. they have followed and done in the village.

Figure 48 – Cleanliness

Funding pattern and financial process (Funding pattern: Guiding Principles):

- First installment will be released to states on receipt and acceptance of proposal containing the brief concept state sanitation strategy as given in Annexure IV.
- For House Hold Toilets, Funds in the first installment will be released as per number of beneficiary household identified, in the concept sanitation plan, at the rate of Rs. 2000/- Central assistance.
- For Community Toilets and Solid Waste Management Projects, Adequate funds will be released on the proposal of the State Government for SWM and Community toilet projects. It will be ensured that funds do not remain parked with the state governments GoI share of grant / VGF may be drawn from this pool fund maintained at state level. This will be replenished on demand by states based on progress.
- States will contribute a minimum of 25% funds towards all components to match 75% Central Share. This will be 10% in the case of North East and special category States.
- Subsequent installments shall be released based on utilization certificates of previous grants, physical and financial progress and other indicators as approved and desired by the National Advisory & Review Committee (NARC).

6.3 Activities Done by Students for allocated village

Students serving as true ambassadors of cleanliness and inspiring others to keep their homes, schools and surroundings clean. Encourage cleanliness in our local areas and make the drive an effective program. Students take the lead by making people aware of waste, waste separation and its value. Keeping their toilets clean and maintaining the hygienation in the village.

Figure 49 – Sochalay (Toilet) Cleanliness

- To avoid the dampness and their results like breeding of mosquitoes Face to face interaction with the villagers.
- To aware the people about the cleanliness, visit of school and teachers to teach about the swachhata and its benefits.
- To initiate use of biogas by the use of cow dung and its proper like manure to avoid the smell of cow dung breeding of flies also let them know about the renewable energy and benefits of installation.
- Chlorination of drinking water of adequate ppm range.

CHAPTER 7. VILLAGE CONDITION DUE TO COVID-19

7.1 Taken steps in allocated village related to existing situation

As the instruction provided by our P.M. and the steps taken the people of the village follow the same and do not go out of their village or home. Nowadays, the whole country is fighting this corona virus. To prevent the spread of the COVID-19 virus, the village sarpanch takes precautions in the village. The sarpanch goes door to door with a team of doctors to check each and every villager's health. The team of doctors will check the temperature and oxygen levels of the villager and take a sample for the laboratory test.

- Wear facemask
- Wash your hand for minimum 20 second.
- Do not touch any ware
- Maintain social distancing up to 6ft
- Sanitize your hand
- Use alcohol-based sanitizer
- Check oxygen level in the body
- Check temperature of body
- Sanitize your house and your workplace regularly etc.

The sarpanch and gram sevak spread the face mask and hand sanitizer in the village and spread the awareness of the COVID-19 virus. The village is regularly sanitized and the villagers support the sarpanch in this pandemic situation by taking appropriate precautions.

7.2 Activities Done by Students for allocated village

Since the village has less population, number of children are also less, but the village has its own government school i.e. Pre-primary school, so at there we raise awareness and explain them about their safety and all the others in the village.

7.3 Any other steps taken by the students / villagers

“No such steps are taken as there is no cases in the village.” But they used mask, sanitizer, wash their hands regularly and maintain social distance. They used to keep their road clean. They used to wear mask, sanitize the things and their hands. They have board or closed the entry of the outsiders. They have followed the norms and regulation form by the government. They don’t use mask when roaming in the village or going to their field.

CHAPTER 8. SUSTAINABLE DESIGN PLANNING PROPOSAL - PART- I

8.1 Design Proposals

Kunkni village is located in Olpad taluka of Surat district. Major occupation is agriculture and cattle farming. The living standards of people is neither luxurious nor poor, good with some basic amenities as compared to other villages that are in developed or in smart village. The current population of Kunkni is 856. There is no any renewable/sustainable infrastructure facilities in the village. It is very important to provide sustainable infrastructure for boosting up economy of village. It will be economical and ecofriendly. About 20-30% are kuchha houses are available in the village and no gas line is available for cooking at houses; they use LPG gas (cylinder) for cooking at the houses. It's a small village so there is issues for some basic amenities, like not having garbage collection system, higher secondary school, general store, etc. are lacking. We can provide Solar Street Lights which uses solar energy to generate electricity. It is the most efficient system for the street lights. Street lights catches the sun rays to the solar panel and generate the electricity and stored which can be used at night; and many more other facility are to be provided as per their use and economically.

8.2 Recommendations of the Design

Table – 11 Recommendations of the Design

Sr.no	Village	Description	Design
1	Kunkni	Civil	Irrigation system
2	Kunkni	Civil	Health center
3	Kunkni	Civil	Anganwadi
4	Kunkni	Civil	Low cost toilet
5	Kunkni	Civil	Water tank
6	Kunkni	Civil	Biogas plant
7	Kunkni	Civil	Smart power theft detection system
8	Kunkni	Civil	Short circuit protection
9	Kunkni	Civil	Vertical axis wind turbine (VAWT)

8.3 LOW COST TOILET

There are several designs and technologies available for installing a household type sanitary latrine. Therefore, it is important to give several technological options or informed choices to the user to choose and own and maintain a sanitary latrine without much external support but several inter-related factors play important role in installing a sanitary latrine to a rural household. There is no public or low cost toilet in our village. For providing hygiene and reducing the risk of spread of diseases we design a low cost toilet. The proposed toilet to be constructed in the main village near the community hall. Here, we give the AutoCAD design with plan elevation and section. Here the superstructure of toilet is constructed by using bricks. This includes:

- Affordability
- Space in the home
- Geographical conditions - soil/water table etc.
- Cultural habits
- Availability of water/scarcity of water
- Availability of skilled or semi-skilled manpower

Salient features: It is a suitable model for all, Low cost, Appropriate where space is limited

For Toilet: Length = 4ft, Width = 6ft, Height = 5.5ft

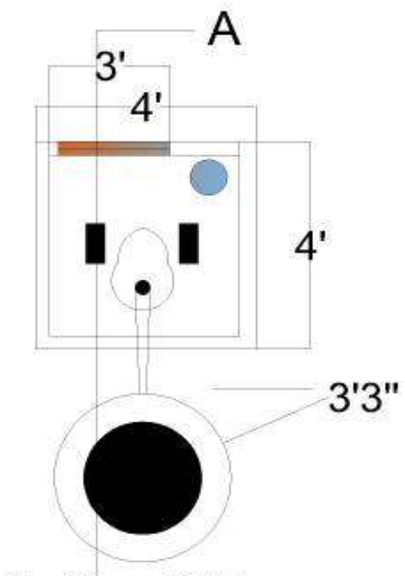
For Pit: Length = 3.28ft, Width = 4ft, Height = 5ft

Estimate of Pit

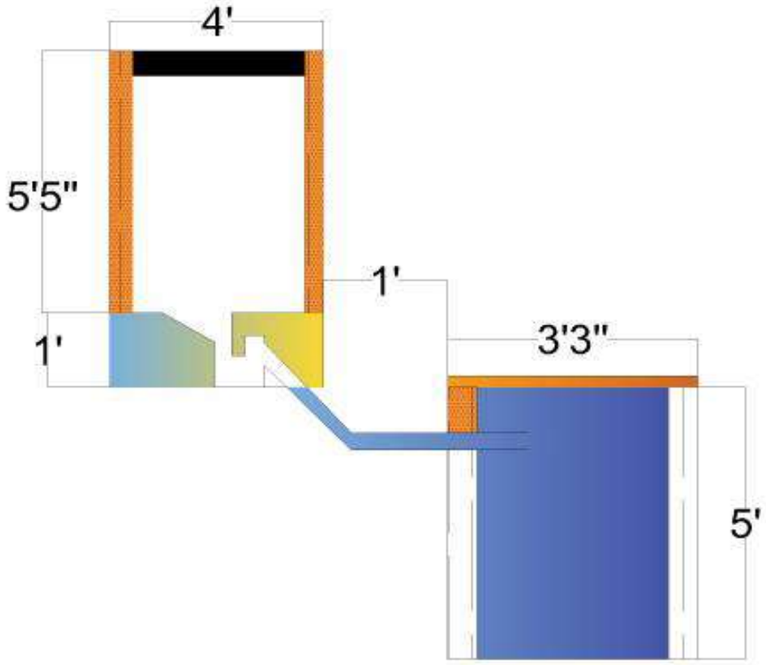
TABLE – 12 Estimate of Pit						
Sr. no.	**Description**	**No.**	**L(m)**	**B(m)**	**H(m)**	**Quantity(m^3)**
1	Excavation Length = 1.005*2 + 0.2*4 + 1.219*2	1	5.248	1.219	1.524	9.74
2	Brick masonry(1:6)	2	1.219	0.20	1.52	0.741
	(assume 0.1m gap between top and bottom of slab)	2	1.0054	0.20	1.32	0.531
3	RCC slab	1	1.0054	1.219	0.1	0.123
					Total	11.135

Total Cost of Toilet + Pit

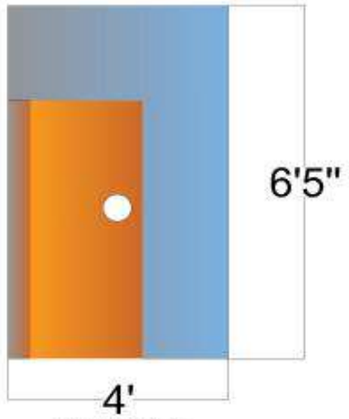
TABLE – 13 Total Cost			
Details	**No. of units**	**Unit cost (in Rs.)**	**Total amount (in Rs.)**
Toilet pan with p-trap (ceramic rural pan with deep slope)	1	300	300
PVC pipe-4 feet (dia. 4 inch)	4 feet pipe	22	88
Bricks	510	4	2040
Cement	3 bags	320	960
Masonry charges	3 mason	350	1050
Sand	1 bullock cart	800	400
Door	1	600	600
Soling stone	1 bullock cart	500	500
Cover slab for pit	1	300	300
Transport charges		500	500
		Total	6766



Top View of Toilet



Section A-A'



Elevation

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.(ALL DIMENSION IN FEET)
2)USE M-20 GRADE CONCRETE
3) FOR TOILET LENGTH 4FEETFEET HEIGHT 5.5
4) FOR PIT LENGTH 3.3FEET WIDTH 4FEET

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	TOILET DESIGN
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Figure 50 – Cross Section (plan), Elevation, Top View of Low Cost Toilet

8.4 DESIGN: RECONSTRUCTION OF ANGANWADI

- A typical Anganwadi center provides basic health care in a village. It is a part of the Indian public health care system. Basic health care activities include contraceptive counseling and supply, nutrition education and supplementation, as well as pre-school activities
- These centers provide supplementary nutrition, non-formal pre-school education, nutrition, and health education, immunization, health check-up and referral services of which the last three are provided in convergence with public health systems.
- This is also made for the 3-4 years of children; where their education, health, nutrition, etc. are to be taken care of and proper nurturing is carried out. If the child belong to poor family. Where they can play with their age of children too.
- Here, we give the AutoCAD design with plan, elevation and section.

Estimation Sheet of Reconstruction of Anganwadi

Table - 14 Estimation Sheet of Reconstruction of Anganwadi

Sr. No.	Description of Item	No.	L (m)	B (m)	H (m)	Quantity (m^3)	Total Qty. (m^3)
1	Earthwork in excavation for Foundation						
	Long wall	2	5.02	0.23	1.2	2.77	
	Short wall	2	3.64	0.23	1.2	2.01	
						Total =	4.78
2	P.C.C.						
	Long wall	2	5.02	0.23	1.2	2.77	
	Short wall	2	3.64	0.23	1.2	2.01	
						Total =	4.78
3	Brick masonry up to plinth in C.M. 1:6						
	Long wall						
	First step	2	4.72	0.60	0.20	1.13	
	Second step	2	4.42	0.51	0.20	0.91	
	Third step	2	4.10	0.40	0.20	0.66	
	Forth step	2	3.8	0.40	0.20	0.61	
	Short wall						
	First step	2	3.94	0.6	0.20	0.95	
	Second step	2	4.05	0.5	0.20	0.81	
	Third step	2	4.15	0.4	0.20	0.66	
	Fourth step	2	4.25	0.3	0.20	0.51	
						Total =	6.26
4	Deduction for walls						
	Door	1	0.76	1.82	0.3	0.41	
	Ventilation	1	0.38	0.38	0.3	0.04	
	Window	1	1.37	1.22	0.3	0.50	

	Lintel cover door window	1	4.11	0.23	0.3	0.28	
	Lintel over ventilation	1	0.70	0.23	0.3	0.05	
						Total =	1.28
6	Beam						
	Long wall	2	5.03	0.23	0.23	0.53	
	Short wall	3	3.66	0.23	0.23	0.58	
						Total =	1.11
6	Column						
	corner	4	0.23	0.30	4.88	1.35	
	Mid	2	0.23	0.23	4.88	0.52	
						Total =	1.87
7	Plaster (single)						
	Long wall	2	5.03		3.94	39.65	
	Short wall	2	3.66		3.94	28.84	
						Total =	68.48
	Plaster(double)						
	Long wall	2	5.03		3.94	39.64	
	Short wall	2	3.66		3.94	28.84	
						Total =	68.48
8	Deduction plaster						
	Window	2	1.37		1.21	3.32	
	Door	2	0.76		1.82	2.77	
	Ventilation	2	0.38		0.38	0.28	
						Total =	6.37
9	White washing(inner water)						
	Long wall	2	5.02		3.96	39.76	
	Short wall	2	3.66		3.96	28.91	
						68.37	
						Total =	137.16
10	Deduction for white washing						
	Window	2	1.37		1.21	3.32	
	Door	2	0.76		1.82	2.77	
	Ventilation	2	0.38		0.38	0.28	
						Total =	6.37

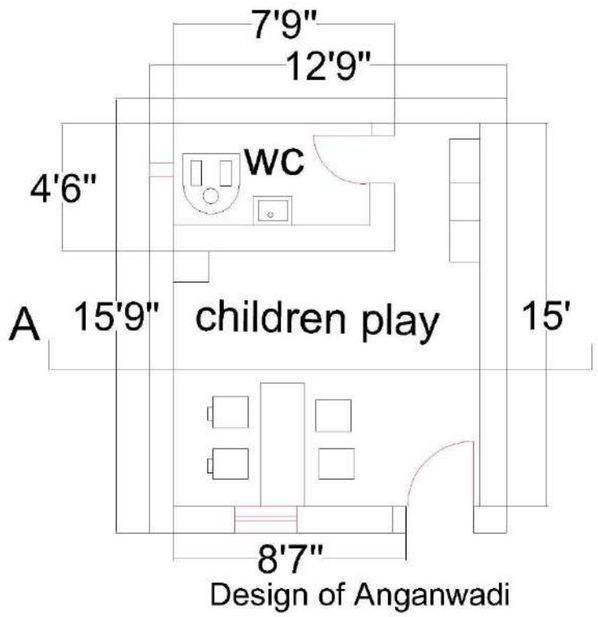
Abstract Sheet of Reconstruction of Aganwadi

Table – 15 Abstract Sheet of Reconstruction of Aganwadi

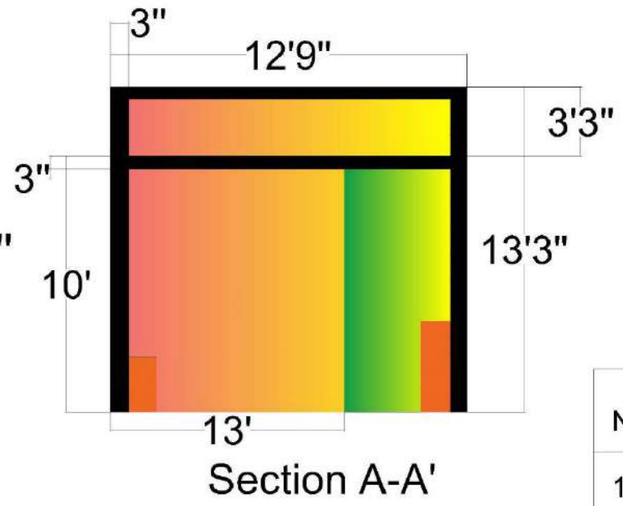
Sr. No.	Description of Item	Quantity	Rate	Per Unit	Total Cost
1	Excavation in foundation	4.78 m^3	90	m^3	430.2
2	P. C. C. (1:4:8)	4.78 m^3	3200	m^3	15296

3	Brick masonry in foundation and plinth(1:6)	6.26 m^3	3700	m^3	23162
4	No. of bricks in foundation & plinth	3500	5	m^3	17500
5	No. of bricks in superstructure	2535	5	m^3	12675
6	Plaster	130.59 m^2	200	m^2	26118
7	White wash	130.79 m^2	10	m^2	1307.9
				Total cost =	96489.1
		Add 1.5% Water Charge			1447.33
		Add 10% Contractor Profit			9648.91
		Total Estimation cost in Rs.			97936.43

Figure 51 (a) – Existing Condition of Anganwadi



Design of Anganwadi

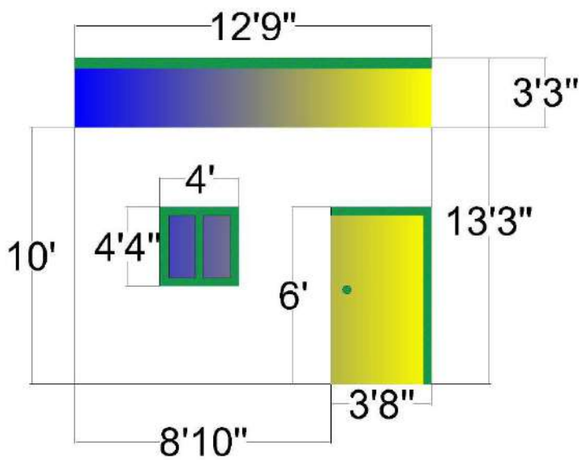


Section A-A'

children play area = 12'3"x9'9"
window =4'x4'4"
door =3'8"x6'
toilet =7'9"x4'9"

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.(ALL DIMENSION IN FEET)
2)USE M-20 GRADE CONCRETE
3)UNLESS OTHERWISE SPECIFIED STIRRUPS IN ALL BEAMS SHOULD BE KEPT DIA 8@8"C/C



Front Elevation

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	ANGANWADI
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Figure 51 (b) – Plan, Section, Elevation of Anganwadi

8.5 DESIGN: HEALTH CENTER

Health centers are community-based and patient-led organizations that provide comprehensive, culturally competent, high-quality primary health care services. Health centers also often integrate access to pharmacy, mental health, substance use disorders and oral health services in areas where economic, geographic or cultural barriers restrict access to affordable health services. Health centers provide care to the nation's most vulnerable individuals and families, including the homeless, agricultural workers, residents of public housing, and veterans of the nation. Here, we give the AutoCAD design with plan, elevation and section.

Estimation Sheet of Health Center

Table – 16 Estimation Sheet Of Health Center

Sr. No.	Description of Item	No.	L (m)	B (m)	H (m)	Quantity (m^3)	Total Qty. (m^3)
1	Earthwork in excavation for Foundation	1	48.55	0.7	1.2	40.78	
	Net C.L. length = 51.35-(0.5*0.7*8)= 48.55						
						Total =	40.78
2	P.C.C.	1	48.55	0.7	0.3	10.19	
						Total =	10.19
3	Brick masonry up to plinth in C.M. 1:6						
	First step	1	49.75	0.4	0.2	3.98	
	Second step	1	50.15	0.3	0.2	3.00	
	Third step	1	50.55	0.2	1.10	11.12	
						Total =	18.1
4	Brick masonry above plinth level						
	Length = 51.35-(0.5*0.2*8)	4	50.55	0.2	3	121.32	
						Total =	121.32
5	Deduction for walls						
	Door - D1	1	1.1	0.2	2.1	0.462	
	D2	1	0.9	0.2	2.1	0.756	
	Window	1	1.8	0.2	1.4	1.512	
	Ventilation	1	0.6	0.2	0.6	0.072	
						Total =	2.80
6	Deduction for lintel						
		1	1.4	0.2	0.15	0.042	
		2	1.2	0.2	0.15	0.072	
		3	2.1	0.2	0.15	0.189	
		1	0.9	0.2	0.15	0.027	
						Total =	0.33

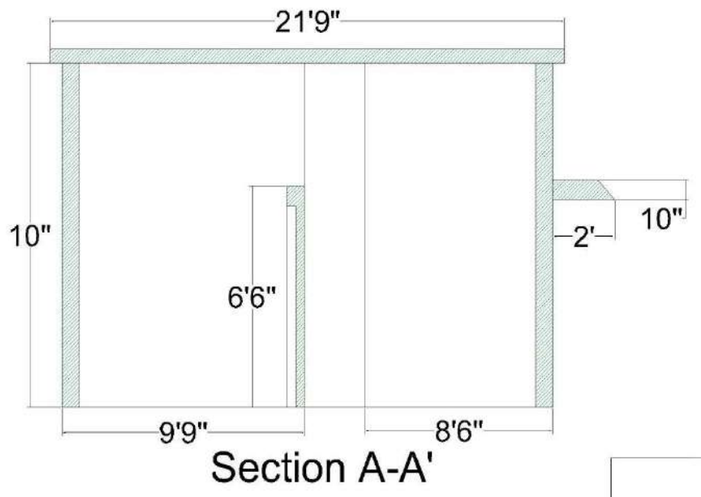
						Net quantity	30.33-2.80-0.33 = 27.2
7	Plaster inside the room	2	3.65		3	21.9	
		2	2.75		3	17.7	
		2	3.65		3	21.9	
		2	3.05		3	18.3	
		2	1.6		3	9.6	
		2	2.75		3	17.7	
		2	1.6		3	9.6	
		2	3.05		3	18.3	
						Total =	135
9	Plaster for ceiling						
	Waiting room	1	2.95	3.65			
	Doctor room	1	3.05	3.65			
	General store	1	2.95	1.6			
	W.C. area	1	3.05	1.6			
						Total =	31.49
10	Deduction for plaster						
	Door D1	1/2	1.1		2.1	1.15	
	D2	6/2	0.9		2.1	5.67	
	Window	3/2	1.8		1.4	3.78	
						Total =	10.6
						Net quantity	135+31.49-10.6 = 125.89

Abstract Sheet of Health Center

Table – 17 Abstract Sheet of Health Center

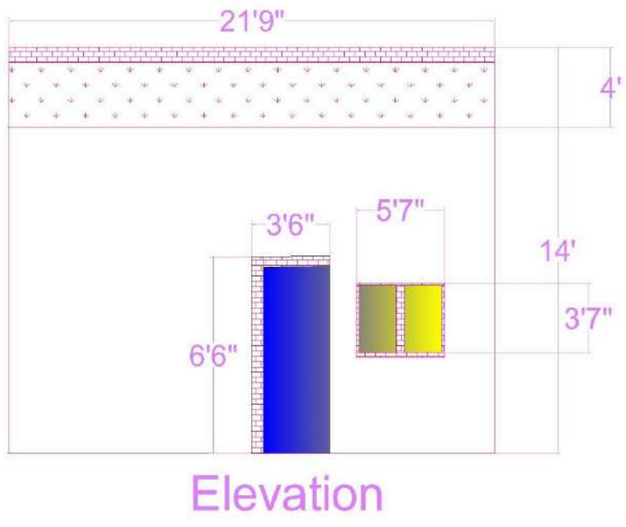
Sr. No.	Description of Item	Quantity	Rate	Per Unit	Total Cost
1	Excavation in foundation	40.78 m^3	90	m^3	4078
2	P. C. C. (1:4:8)	10.19 m^3	3200	m^3	32608
3	Brick masonry in foundation and plinth(1:6)	18.1 m^3	3700	m^3	66970
5	Bricks masonry in superstructure	27.2 m^3	4000	m^3	108800
6	Plaster	125.89 m^2	200	m^2	25178
7	White wash	125.89 m^2	15	m^2	1888.35
				Total cost =	239522.35
		Add 1.5% Water Charge			3592.8
		Add 10% Contractor Profit			23952.235
		Total Estimation cost in Rs.			267067.385

design of health center



Section A-A'

doctor room =9'3"x12"
general store =8'3"x6'3"
toilet or w.c. =9'3"x6'3"
waiting room =8'3"x12'
wall =9 " inch
D1 door =3'6"x6'6"
D2 door =3'x6'6"
window =5'7"x3'7"



Elevation

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.(ALL DIMENSION IN FEET)
2)USE M-20 GRADE CONCRETE
3)UNLESS OTHERWISE SPECIFIED STIRRUPS IN ALL BEAMS SHOULD BE KEPT DIA 8@8"C/C

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	HEALTH CENTER
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Figure 52 – Plan, Section, Elevation of Health Center

8.6 DESIGN: FURROW IRRIGATION METHOD

In the furrow method of irrigation water is applied to the land to be irrigated by a series of long, narrow field channels called furrows which are dug in the land at regular intervals. The water flowing in the furrows infiltrates into the soil and spreads laterally to irrigate the land between the furrows. In the furrow method only a part of the land varying from one- half to one-fifth is wetted which results in reducing the evaporation losses. The furrow method of irrigation is commonly used for row crops such as maize, cotton, potatoes, sugarcane, sugar beet, groundnut, tobacco, vegetables, etc. Here, we give the AutoCAD design with plan elevation and section.

The supply of water in the field is from the canal to storage tank to field through pumping unit.

Design Features of Furrow Method of Irrigation. Different considerations for the design of furrow irrigation are as indicated below.

- Spacing of furrow: The spacing of furrows is determined by the spacing desired for the rows of Plants because most of the cases one furrow is provided for each row of the plants. Here spacing of 300 to 400mm is provided.
- Shape and size: it mainly depend on the soil condition and type of crop. U-shape furrow is given. Low permeability of soil – wide and shallow furrow is constructed.
- Depth of furrow: for vegetables and rice – 75 to 125mm.
- Length of furrow: it depend on the slope of the ground or surface area. i.e. flat surface.

Table – 18 Features

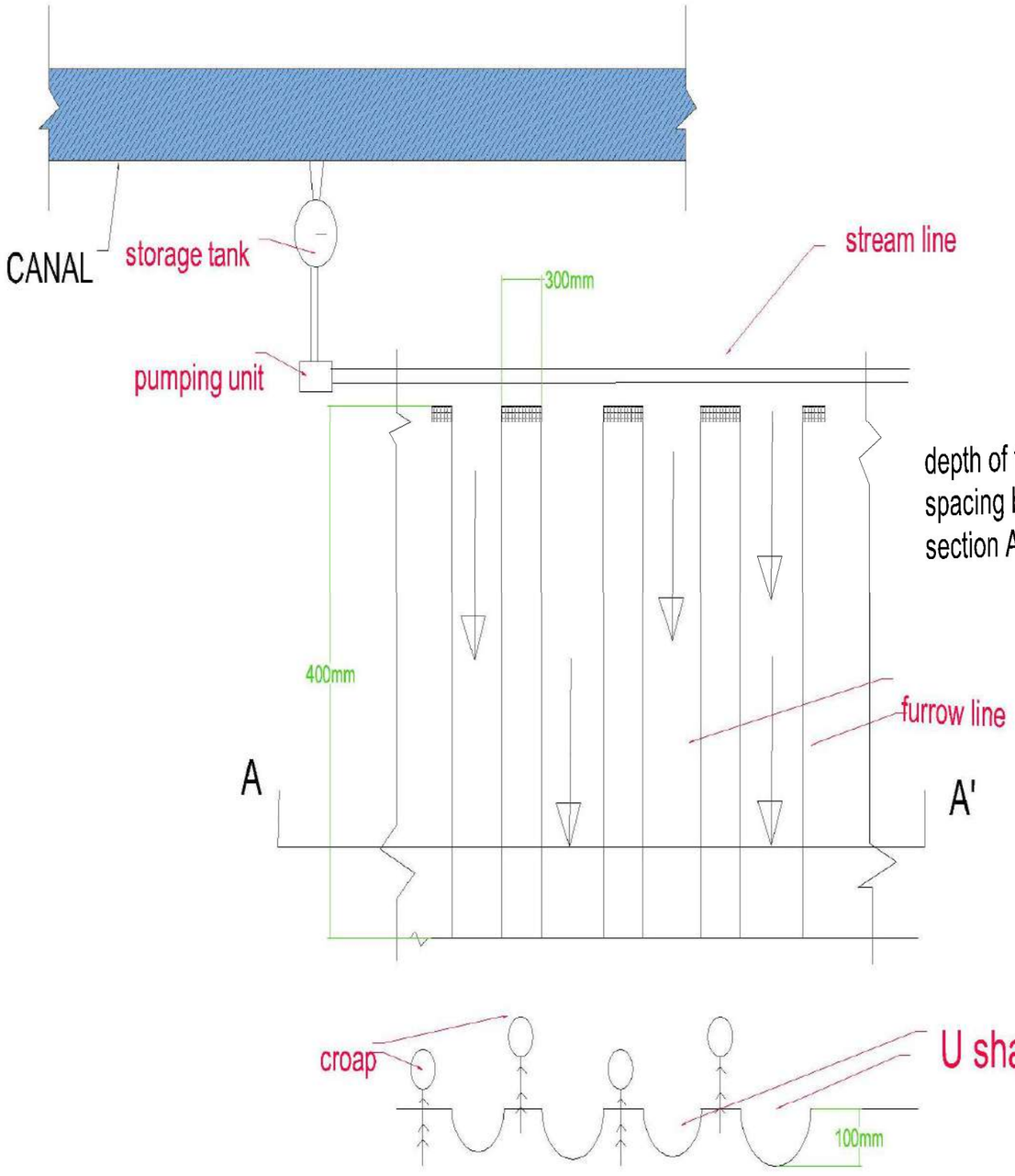
Slope	0.3%
Type of soil	Clay
Length of furrow in meter	Depth of water application 75mm 150mm 390m 500m

- Furrow slope: controls the velocity of flow of water in the furrow. Minimum 0.05% is provided to ensure the surface drainage.
- Stream size: vary from 0.5 to 2.5lit/sec.
- $q = \frac{0.60}{s}$ = 2lit/s
- q = max. Non-erosive stream size in lit/sec;
- s = slope of furrow expressed as percent.
- Average depth of water applied
- $d = \frac{q*3600*t}{W*L}$
- $t = \frac{d*W*L}{q*3600}$ = 1.625 ~ 1.6hr.

The amount may vary as per the field area (i.e. 0.5ha, 1ha, etc.) and the owner of the field.

TABLE – 19 Cost of Furrow Irrigation (Assumption value for 25.2ha)	
Irrigation System	Furrow
Unit size (ha)	25.2 ha
Planned water use (mm/ha·yr)	1917
Water charge (c/m^3)	13.98
Electricity: fixed payment (R/month)	134.53
Electricity 0-600 kWh (c/kWh) > 600 kWh	31.97 18.38
Insurance tariff: Pump station (%)	0.92
Labour costs (R/hour)	3.65
Real interest rate (%)	5.0
Repair and maintenance costs (% of purchase price/1 000 h·yr)	60020.1
Initial investment cost (R)	132012 Rs

There are many policies or scheme related irrigation system that is provided for the farmers; so the above system is also developed under the suitable scheme for the village and which is suitale as per the area.



depth of furrow line 100mm
spacing between furrow line 300mm
section A-A'

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.(ALL DIMENSION IN MM)
2)USED U-SHAPED FURROW LINE
3)THERE IS NOT POSSIBLE ELEVATION OF FURROW DESIGN
4)USE WATER RESOURCE AS CANAL AND DISTRIBUTE WATER

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	FURROW DESIGN
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Figure 53 – Plan, [Section – Elevation (same)] of Furrow Irrigation

8.7 DESIGN: RECTANGULAR OVERHEAD WATER TANK

Only one overhead water tank is situated in Kunkni village for fulfilling all needs which has only capacity of 10000 Litter which is not sufficient for the villagers. So, one rectangular overhead water tank is designed of capacity of 27,000 Litters which will fulfill all needs of villagers. Here, we give the AutoCAD design with plan elevation and section.

Design Details:

- Length of tank= 3.3m
- Width of tank= 3.3m
- Height of tank=2.5 m
- Capacity of water tank= 27.225m^3 = 27225 Liter
- Actual capacity of water tank= 22.5 m^3=22500 liter
- Concrete grade = M25
- Steel grade = Fe 415

One rectangular overhead water tank of capacity is designed capacity of 27,000 Litter which requires P.C.C. (1:4:8) at base and 4.75m * 4.75m land is consumed by tank foundation. The Thickness of walls are 150 mm. All Reinforcement Details are shown below.

Design of Roof

Ast required	Ast provided	Reinforcement details
490 mm^2	526 mm^2	10 mm Ø - 150 mm c/c

Design of Base Slab

Ast required	Ast provided	Reinforcement details
240 mm^2	252 mm^2	12 mmØ - 90 mm c/c

Design of Longer and Shorter Walls

Table - 20 Design Of Longer And Shorter Walls

Specification	Ast required	Ast provided	Reinforcement details
Longer Wall At support: inner face outer face	490 mm^2	452 mm^2	16 mmØ - 110 mm c/c 10 mmØ - 150 mm c/c
At center: inner face outer face	875 mm^2		12 mmØ - 250 mm c/c 12 mmØ - 150 mm c/c
Distribution steel:			12 mmØ - 250 mm c/c
Shorter Wall	490 mm^2		10 mmØ - 110 mm c/c

At support: inner face outer face		452 mm²	10 mmØ - 150 mm c/c
At center: inner face outer face	875 mm²		10 mmØ - 250 mm c/c 10 mmØ - 150 mm c/c
Cantilever action at bottom:			10 mmØ - 150 mm c/c

Estimate of Rectangular Overhead Water Tank

Table – 21 Estimate of Rectangular Overhead Water Tank

Sr. No.	Description	No	L(m)	B(m)	D(m)	Quantity (m^3)
1	Earthwork excavation					
	Columns	4	1.60	1.60	2.40	24.59
	Bottom beam	4	1.55	0.30	0.30	0.56
2	Sand cushion					
	Column	4	1.60	1.60	0.40	4.10
	Bottom beam	4	2.85	0.30	0.15	0.51
3	Foundation concrete In P.C.C. 1:4:8					
	Column	4	1.60	1.60	0.30	3.07
	Bottom beam	4	2.85	0.30	0.15	0.51
4	Foundation in R.C.C. 1:1.5.3 for footing					
	Footing bottom square portion Trapezoidal portion	4 4	1.60 1.33	1.60 -	0.30 0.80	3.07 4.16
	Column in R.C.C. 1:1.5:3 below GL	4	0.30	0.30	0.60	0.22
	Column in R.C.C. 1:1.5:3 above GL	4	0.30	0.30	6.35	2.29
5	Beams in R.C.C. 1:1.5:3					
	Ground beam, brace beam	2×4	2.85	0.30	0.30	2.05
	Top beam	1×4	2.85	0.30	0.40	1.37
6	Vertical wall of a tank In R.C.C. 1:1.5:3	1×1	12.6	0.15	2.50	4.73
7	Floor and root slab of Tank in R.C.C. 1:1.5:3					
	Floor slab Root slab	1 1	3.45 3.30	3.45 3.30	0.15 0.10	1.79 1.09
8	Concreting work for column					
	Concreting area for Column footing Column below GL Above bottom beam Above brace beam	1×4 1×4 1×4 1×4	6.40 1.20 1.20 1.20	- - - -	0.30 0.60 2.70 2.65	7.68 2.88 12.96 12.72

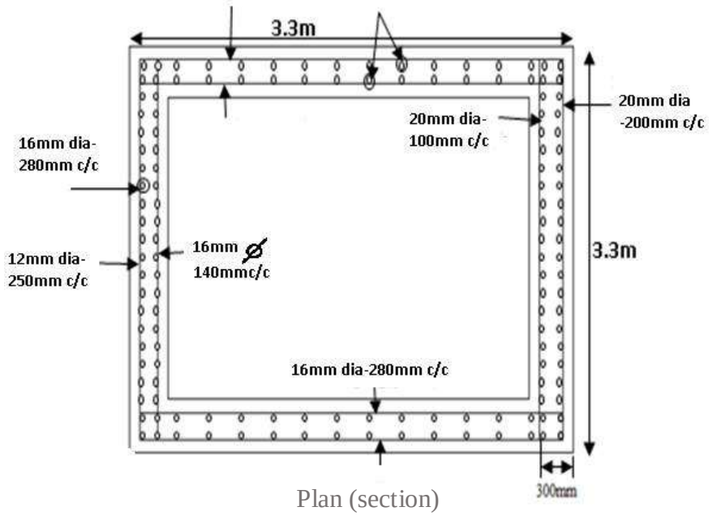
9	Concreting works for Beam and brace beam					
	Bottom beam Inner side Outer side	1×4 1×4	2.85 3.45	- -	0.30 0.30	3.42 4.14
	Brace beam Bottom Inner side Outer side	1×4 1×4 1×4	2.85 2.85 3.45	0.30 - -	- 0.30 0.30	3.42 3.42 4.14
	Top beam Bottom Inner side Outer side	1×4 1×4 1×4	2.85 2.85 3.45	0.30 - -	- 0.40 0.40	3.42 4.56 5.52
10	Concreting for floor slab Side	1×4 1×4	2.85 3.45	2.85 -	- 0.15	8.12 2.07
11	Concreting for root slab Side	1×4 1×4	3.3 3.3	3.3 -	- 0.1	10.89 1.32
12	Concreting work for tank Vertical walls Inside Outside	1×4 1×4	3 3.3	- -	2.50 2.50	30.00 33.00
13	Plastering outer side 18mm thick C.M. 1:4					
	Outer face of tank wall, Bottom of floor slab (outside) Top of root slab	1×4 1×4 1×4	3.30 2.85 3.30	- 2.85 3.30	2.68 - -	35.39 8.12 10.99
14	Inside plastering C.M. 1:4 12 mm thick					
	Tank vertical wall Bottom of floor slab Top of root slab	1×4 1×4 1×4	3 3 3	- 3 3	2.5 - -	30 36 36
15	Plastering of beams and columns					
	Bottom beam side Top Brace beam, side Top and bottom Top beam, sides Top and bottom Column plastering	4×2 4×1 4×2 4×2 4×2 4×2 4×4	2.85 2.85 2.85 2.85 2.85 2.85 0.30	- - - - - 0.30 -	0.30 0.30 0.30 0.30 0.40 - 6.45	6.84 3.42 6.84 6.84 9.12 6.84 30.69
	Deduction joint of Column and beam Bottom beam Brace beam Top beam	4×2 4×2 4×2	0.30 0.30 0.30	0.30 0.30 0.40	- - -	-0.72 -0.72 -0.96
	Net plastering area					68.19m²

Abstract Sheet of Water Tank

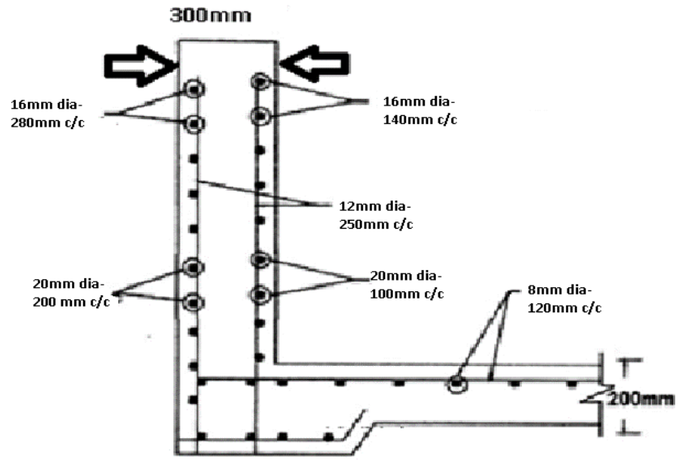
Table - 22 Abstract Sheet of Water Tank					
Sr. No.	**Quantity**	**Description of Item**	**Rate(Rs)**	**Per**	**Amount(Rs)**
1	P.C.C for base surface (1:4:8)				
	Materials: 13 bags	Cement	280	Bag	3640
	1.68 m^3	Sand	800	m^3	1344
	3.37 m^3	Aggregate	1000	m^3	3370
		Sundries			50
				Total	8404
	Labour: 0.25	Mistry	400	Day	100
	0.5	Mason	300	Day	150
	3	Male coolie	200	Day	600
	5	Female coolie	180	Day	900
	1	Bhistie	200	Day	200
		Sundries			50
				Total	2000
2	R.C.C work (1:1.5:3)				
	Materials: 264 bags	Cement	280	Bag	73,920
	13.66 m^3	Sand	800	m^3	10,928
	27.32 m^3	Aggregate	1000	m^3	27,324
	5775 Kg	Steel	45	Kg	259,875
	53 kg	Binding wire	50	Kg	2650
	-	Sundries			50
				Total	3,74,747
	Labour: 33	Labour for mixing, transporting and placing	300	m^3	9900

		concrete, including curing			
	-	Cost of hiring mixture and vibration	-	L.S.	1000
	5775	Labour for bending, cutting, placing, reinforcement steel	5	Kg	28.875
	-	Labour for centering and shuttering	-	L.S.	5000
		Sundries			50
				Total	44,825
3	16 mm Thick cement plaster on outer face of tank in C.M. (1:3)				
	Materials: 23 bags	Cement	280	Bag	6440
	2.4 m^3	Sand	800	m^3	1920
	-	Sundries			50
				Total	8410
	Labour: 0.25	Mistry	400	Day	100
	13	Mason	300	Day	3900
	13	Male coolie	200	Day	2600
	13	Female coolie	180	Day	2340
	2	Bhistie	200	Day	400
		Sundries			50
				Total	9390
4	1mm Thick cement plaster on inner face of tank in C.M. (1:4)				
	Materials: 23 bags	Cement	280	Bag	2340
	2.4 m^3	Sand	800	m^3	1440

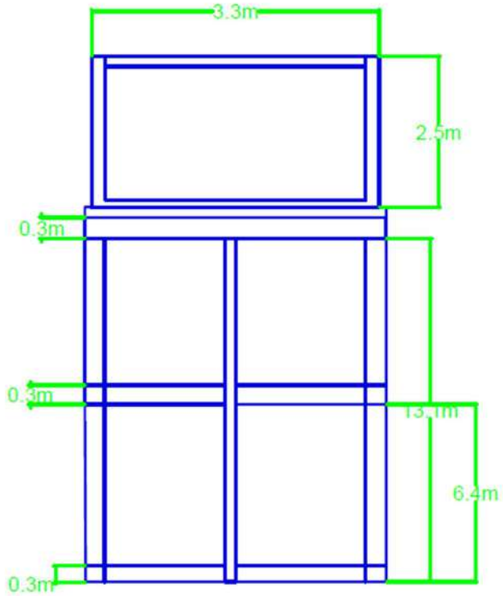
	-	Sundries			50
				Total	3830
	Labor: 0.5	Mistry	400	Day	200
	12	Mason	300	Day	3600
	12	Male coolie	200	Day	2400
	12	Female coolie	180	Day	2160
	2	Bhistie	200	Day	400
		Sundries			50
				Total	8810
5	Column & Beam				
	Material: 24 bags	Cement	280	Bag	6720
	24 m^3	Sand	800	m^3	19200
	20m^3	Aggregate	1000	m^3	20000
	300kg	Steel	450	Kg	135000
				Total	162920
	Labour:				
	11	Labour	350	Day	3850
	4	Mistry	400	Day	1600
	2	Mason	400	Day	800
	3	Bhistie	200	Day	600
				Total	6850
				Net Total Estimate	630186
		Add 1.5 % water charge			9453
		Add 10 % contractor's profits			60318.6
			Total required cost =		702657.6



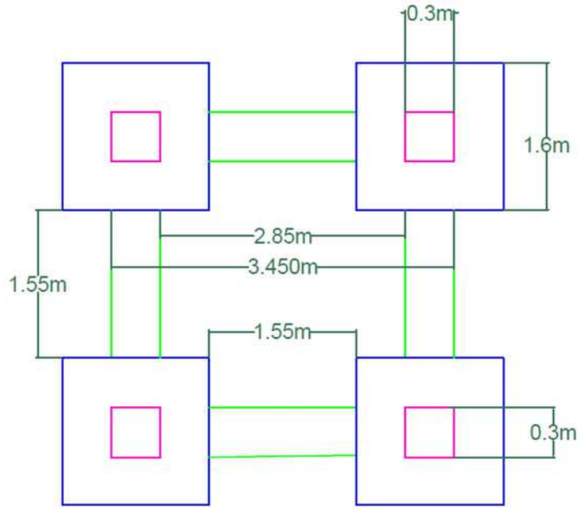
Plan (section)



Cross section of wall



Elevation of Elevated water tank



Foundation of water tank

NOTES:-
1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.
2)USE M-25 GRADE CONCRETE AND STEEL Fe415 GREAD
3)UNLESS OTHERWISE SPECIFIED STIRRUPS IN BEAMS SHOULD BE KEPT DIA 8@120MMC/C AND 16@140MMC/C

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	OVERHEAD WATER TANK
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Figure 54 – Plan, Section, Elevation of Overhead Water Tank

8.8 DESIGN: BIOGAS PLANT

The biogas plant is usually constructed where there are cattle's, because by decomposing the feace/dung of the animals the gas is produces and that gas is used for the cooking purpose nowadays LPG is too costly to buy for everyone, poor family cannot buy it. So biogas plant is setup where the placed is available and for the one who has more no. of cattle.

Design:

Total no. of animals (buffalo, cow) in village = 150

As per standard data assume per day dung of animals = 10.5 kg

So, total dung per day = 150 x 10.5 = 1575 kg/day

Design of Digester:

Assume retention period (R) = 70 days

Assume mixing proportion of solid and water is 1:2.

Now total amount of slurry per day (S) = Total dung per day + water amount

= 1575 + 2(1575)

= 4725 kg/day

= 4.725 m^3/day

Digester Volume = S x R = 4.725 x 70 = 1278.9 = 330.75 m^3

Assume cylinder shape biogas plant.

Provide total 2 no. of unit in different area.

So, digester volume becomes = 330.75/2 =165.375 m3

Provide =165.375 m3

Total digester volume (V_d) = $\pi r^2 h$

165.375 = πr^2 (10), assume h = 10 m

r = 2.294 m

So, dimensions are h = 10 m, r =2.294 m ~3 m

Design of Gas Holder:

Assume digester temperature = 26-28 ^oC

Now,

Specific Gas Production (G_d) = 37 litre/day

Daily Gas Production G = G_d x Feed Volume = 37 x 4725 = 174825lit =174.825 m3

Now,

Assume Gas Holder capacity = 60%

Gas Holder Volume = Daily Gas Production x Capacity of Holder

= 174.825 x 0.60

$= 104.895\ m^3$

So, take gas holder volume = 200 m^3

Now, for 2 units provide volume of holder each unit =200 m^3 / 2 = 100m^3

Provide cylinder shaped,

Therefore, Volume = $\pi r^2 h$

100 = πr^2 (1) assume h = 1

r = 5.641 m

So, dimension of the gas holder: h = 1 m, r = 6 m

Design of Inlet and Outlet:

Total Volume of slurry mix deposit = 4.725 / 2 = 2.3625 m3/ day

Assume two time filling operation in plant.

So, take total volume of slurry = 2.3625 / 2 = 1.18125 m^3/ day = 2 m^3/ day

Provide Rectangular tank.

So, Total volume for one time mixing of slurry = L x B x H

2 = L x B x 1

Dimensions of inlet: L =2.5 m

B = 2 m

H = 1 m

Here, 2 m^3/ day required < 3 m^3/ day provided.

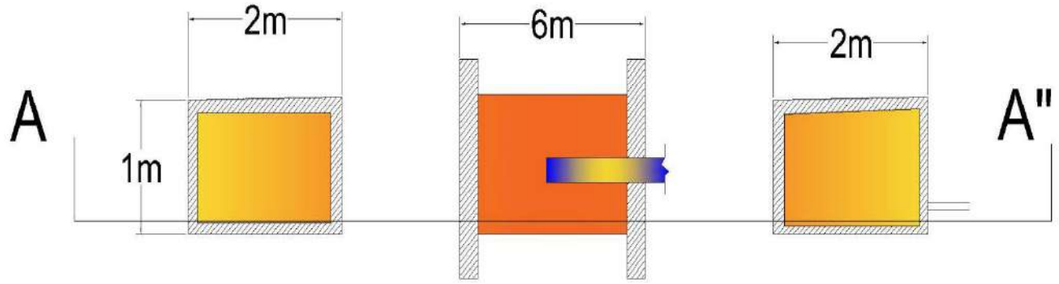
Hence OK.

Provide same size of outlet also.

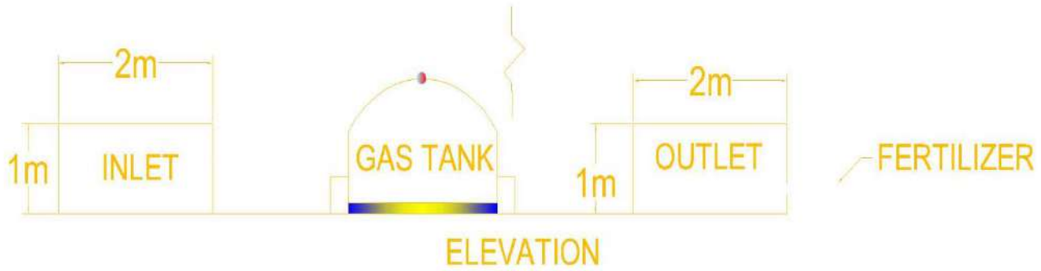
Cost of biogas plant

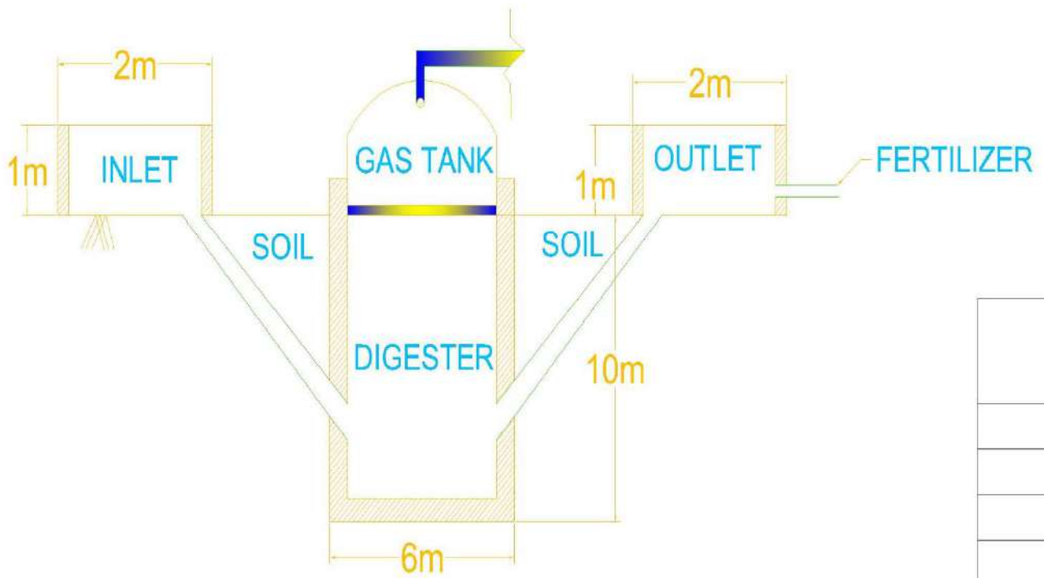
The annual amount of excrements collected accounts for 80% of that discharge.

The initial investment of biogas plant is 10,000 to 20,000 and which one can recover the cost by saving one LPG cylinder every month; plus - mainly depend on the type of digester, location, and supply to the houses.



Top View of Bio-Gas Plant





BIO-GAS PLANT SECTION A-A'

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.
2)SET A PARALLEL INLET AND OUTLET CHEMBER
3)THE ORGANIC MATERIAL DECOMPOSED IN WET ENVIRONMENT
4) DIGESTER AND SUPPLY CHAIN CONSTRUCT ON UNDERGROUND

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	BIO-GAS PLANT
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Figure 55 – Cross Section (Plan), Elevation, Top View of Biogas

8.9 DESIGN: SMART POWER THEFT DETECTION SYSTEM

Electricity is one of the most important blessings that science has given to mankind. It has also become a part of modern life and one cannot think of a world without it. Electrical power generated at the power station are provided to the end user through the distribution substations. In between this occurs the most manifested problem in electrical power system widely known as "Power theft". It is defined as the use of electrical power without a contract with a supplier with total or partial bypassing of the metering system. It results in increased economic losses to the country and leads to non- uniform distribution of electricity. Electricity thefts is the emerging theft not only in urban areas but also in rural areas. The country faces power theft in both domestic sector and industrial sector. The design provided here detect the power theft in the transmission lines and energy meters by monitoring the power consumption by load.

Direct hooking from line. What's known as "cable hooking" is the most used method. 80% of global power theft is by direct tapping from the line. The consumer taps into a power line from a point ahead of the Energy meter. This energy consumption is unmeasured and procured with or without switches. Bypassing the energy meter in this method, the input terminal and output terminal of the energy meter is bridged, preventing the energy from registering in the energy meter. Physical obstruction etc. This type of tampering is done to electromechanical meters with a rotating element. Foreign material is placed inside the meter to obstruct the free movement of the disc. A slower rotating disk signals less energy consumption. Injecting foreign element in the energy meter. Meters are manipulated via a remote by installing a circuit inside the meter so that the meter can be slowed down at any time. This kind of modification can evade external inspection attempts because the meter is always correct unless the remote is turned on.

Hardware Implementation of the System

The hardware implementation of the system includes the following modules:

1. Arduino Uno
2. Current Sensing Module (ACS 712)
3. GSM (SIM 800)
4. GPS Module
5. Database (using My SQL)

Architecture of the proposed system

As shown in fig.56 we connect a current sensing module ACS712 in both the distribution box and the meter installed in the house. The current from ACS712 is fed into a micro-controller (Arduino Uno).The data of either sides is then sent to the authorized database after the Arduino is interfaced with the GSM-GPS module. Hence the data are compared, if the difference is more than the provided threshold, POWER THEFT is detected. Shown in fig. 56.

Arduino UNO

Arduino is an open-source electronics prototyping platform based on flexible, easy-to use hardware and software. As Arduino is open source, the CAD and PCB design are freely available. There are several different Arduino boards are available on the market (both original and cloned) such as Arduino UNO, Arduino Nano, Arduino Mini and Arduino Mega. Fig. shown in 57.

The below are the specifications of Arduino.

- Analog input ports
- Power Input connector.
- 14 digital I/O ports (of which 6 PWM)
- Standard USB for data and power and programming.
- Female headers.
- Hardware serial port (UART)

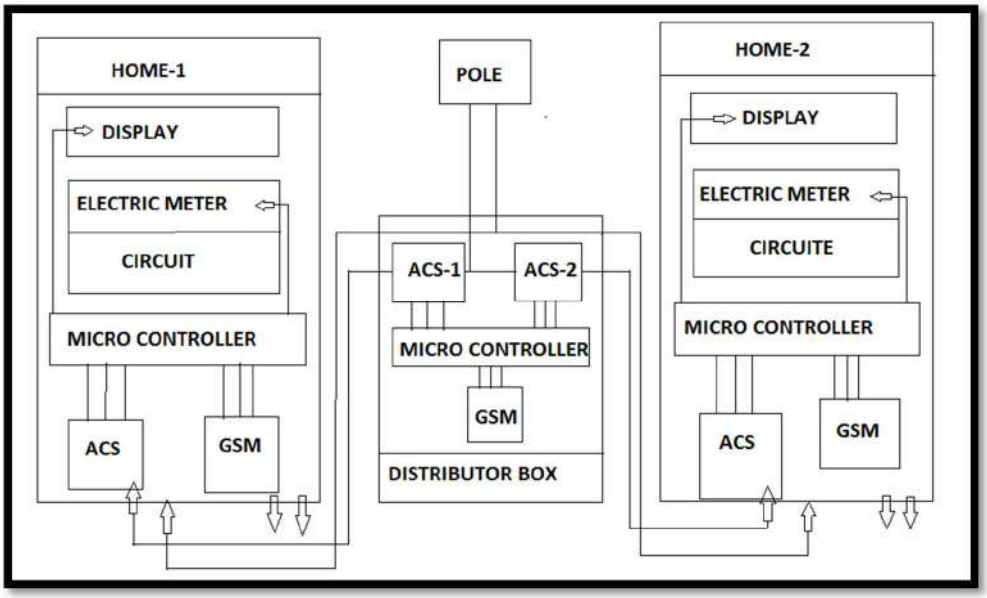


Figure 56 - Architecture of the Proposed System

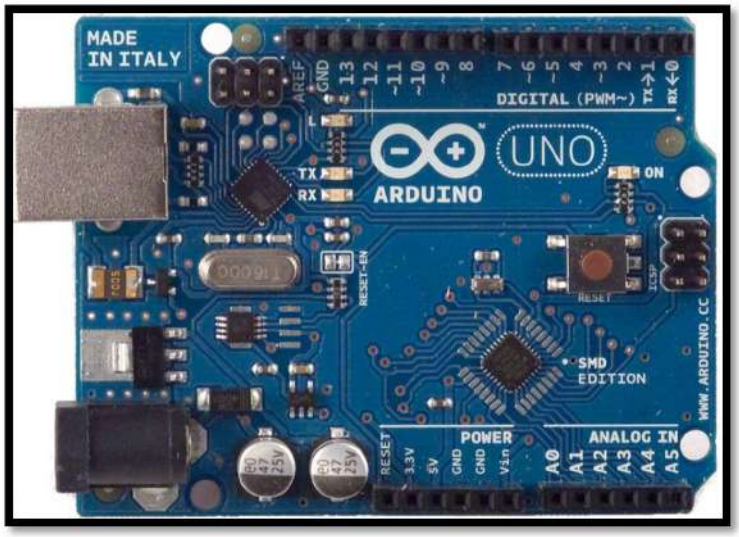


Figure 57 - Arduino UNO

Current sensing Module (ACS 712)

The ACS712 Current Sensor as appeared in Fig.58 offered on the web are intended to be effortlessly utilized with microcontroller like the Arduino. These sensors depend on the Allegro ACS712ELC chip. These current sensors are offered with full scale value of 5A, 20A and30A.

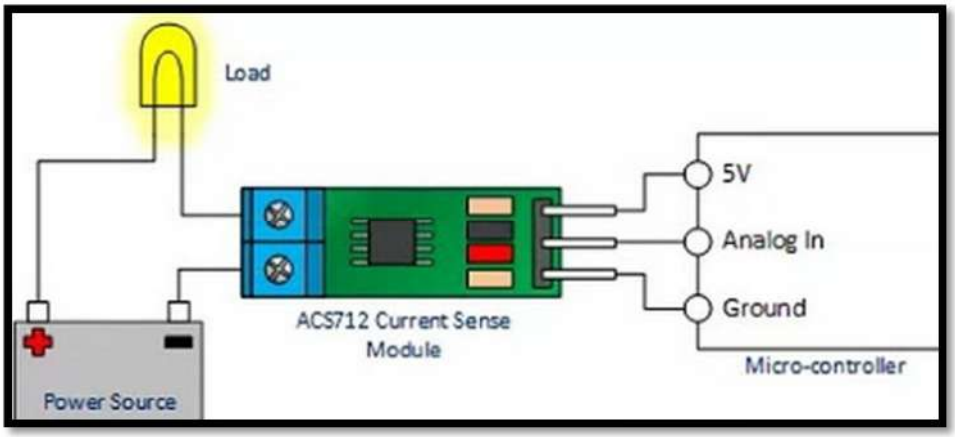


Figure 58 - Current Sensing Module

GSM Module

Figure 59 - GSM Module

Overview SIM800 is a quad-band GSM/GPRS module(shown in fig.59) that works on frequencies 850MHz GSM, 900MHz EGSM, 1800MHz DCS, and 1900MHz PCS. It also features GPRS multi-slot class 12/class 10, and supports CS-1, CS-2, CS-3, and CS-4 GPRS coding schemes.

GPS Module

To get the information of the device's geographical position, a GPS navigation device is needed that is capable of receiving information from satellites. Using suitable software, the device may display the position on a map, and it may offer directions. SIM800 has 68 SMT pads, and provides all hardware interfaces between the module and customers' boards. So to detect this we have to make the following arrangements: Firstly we will use a GPS module to store the latitude and longitude of every pole and house on the 1st day of installation of the meter.

Block level demonstration of the system

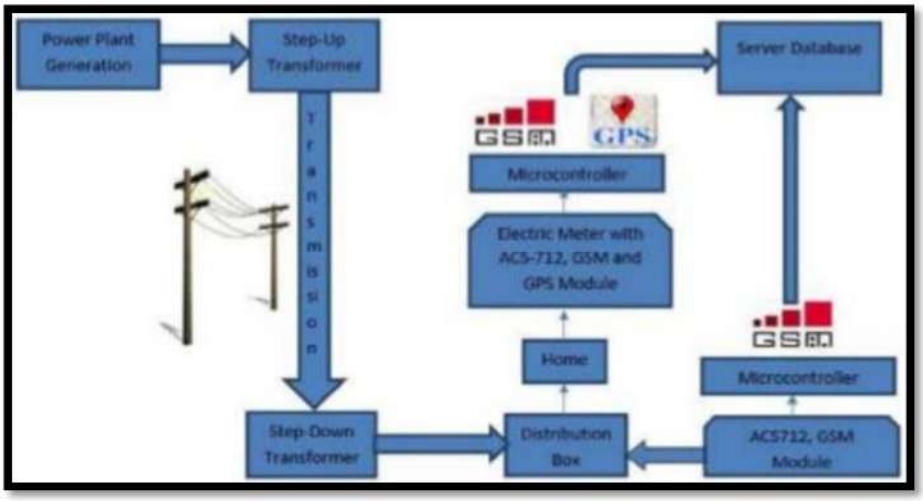


Figure 60 - Block Diagram of the Power Theft

The live wires from the POLES should be fed into a distributor box block wise. The distributor box has the capability of distributing the power among the houses of particular locality. Accordingly, subsequent distributor box will be setup for a cluster of houses. Hence the AC current is measured in the distributor box independently for each house utilizing the ACS712 and the extent of this current is fed into module and the magnitude of this current is fed into the microcontroller A server side database is maintained and the measured value of current is transmitted with the help of GSM/GPRS module and is updated into the database table containing the user-id at a regular desired period.

The main objective of this connection is to measure the flow of electricity entering the electric meter. So a fixed association is made at the terminal of the electric meter in such a manner that tampering of this connection is made void with the help of laser sensors and microcontroller. The respective connection too consists the ACS712 module to measure the AC current and fed into the microcontroller. Consequently now a similar estimated current is communicated with the help of GSM/GPRS module and is updated in the same database table for same user-id that was maintained for the distributor box at regular desired period.

Advantages

The proposed system provides the solution to some of the major problems India's existing network system is facing such as energy waste, power theft, manual billing structure and error in the transmission line. This technique will reduce energy waste and save a lot of energy for future use. It can distinguish the area where power theft is undergone. Optimized use of energy. Automatic user identification

Estimated cost

Arduino Uno: - 670/-
Current sensing unit acs 712:- 450/-
GSM SIM800 + GPRS: - 2200/-
Other charge one time fitting and all etc.:-2000/-
Total Estimate for this project:-5500/-

Applications:

Power theft concept is most useful in village area homes and near farms that device fit on the consumers meter after use of this device the power theft ratio is low and more useful to save the power. The system can be incorporated for almost all types of users. The concept is well suited especially for villages and interior areas. This will help uniform distribution of electricity and reduce the economic losses that occurs due to power theft.

8.10 DESIGN: SHORT CIRCUIT PROTECTION

Power system protection is a branch of electrical power engineering that deals with the protection of electrical power systems from faults through the disconnection of faulted parts from the rest of the electrical network. The objective of a protection scheme is to keep the power system stable by isolating only the components that are under fault, whilst leaving as much of the network as possible still in operation. Thus, protection schemes must apply a very pragmatic and pessimistic approach to clearing system faults. The devices that are used to protect the power systems from faults are called protection devices. Short circuit protection is protection against excessive currents or current beyond the acceptable current rating of equipment and it operates instantly. As soon as an overcurrent is detected, the device trips and breaks the circuit. Short circuits are a major type of electrical accident that can cause serious damage to your electrical system. They occur when a low-resistance path not suited to carry electricity receives a high-volume electrical current. The result of a short circuit can be appliance damage, electrical shock, or even a fire.

1. Miniature Circuit Breaker (MCB)

Miniature Circuit Breakers are electromechanical devices which protect an electrical circuit from an overcurrent. The overcurrent, in an electrical circuit, may result from short circuit, overload or faulty design. An MCB is a better alternative to a Fuse since it does not require replacement once an overload is detected. Unlike fuse, an MCB can be easily reset and thus offers improved operational safety and greater convenience without incurring large operating cost. MCB is a switch which automatically turns off when the current flowing through it passes the maximum allowable limit. Generally MCB are designed to protect against over current and over temperature faults (over heating).

Whenever continuous overcurrent flows through MCB, the bimetallic strip is heated and deflects by bending. This deflection of bimetallic strip releases a mechanical latch. As this mechanical latch is attached with the operating mechanism, it causes to open the miniature circuit breaker contacts, and the MCB turns off thereby stopping the current to flow in the circuit. To restart the flow of current the MCB must be manually turned ON. This mechanism protects from the faults arising due to overcurrent or overload. Whenever continuous over current flows through MCB, the bimetallic strip is heated and deflects by bending. This deflection of bimetallic strip (shown in fig.62) releases a mechanical latch. As this mechanical latch is attached with the operating mechanism, it causes to open the miniature circuit breaker contacts (shown in fig.63), and the MCB turns off thereby stopping the current to flow in the circuit. To restart the flow of current the MCB must be manually turned ON. This mechanism protects from the faults arising due to over-current or overload.

There are two main types of trip mechanism.

1. A bi-metal provides protection against overload current.
2. An electromagnet provides protection against short-circuit current.

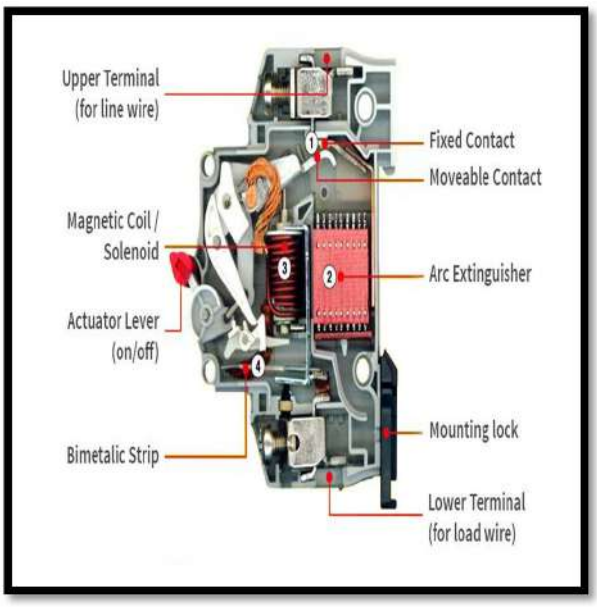


Figure 61 – Detail Photo of MCB

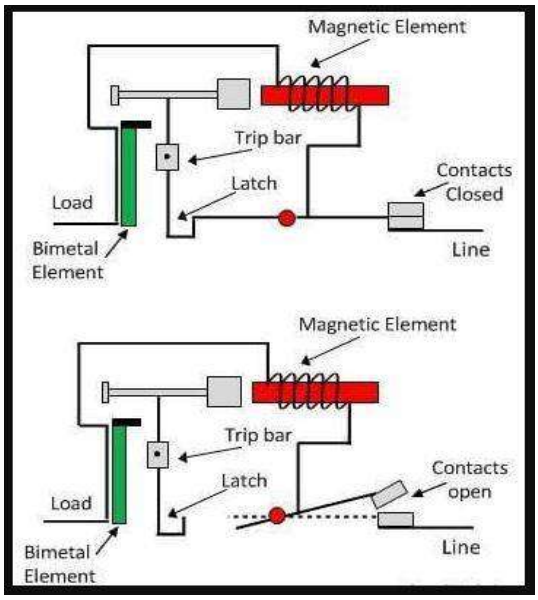


Figure 62 – MCB Circuit Diagram

Current Ratings of MCB

Standard rating of MCB is 1A, 2A, 3A, 4A, 6A, 10A, 13A, 16A, 20A, 25A, 32A, 40A, 50A, 63A, 100A for MCB

Cost: - Miniature circuit breaker estimate cost around 600/- to 1000/-

Figure 63 - (MCB 10A) **(MCB 63A)**

Advantage of MCB

1. MCB is quick work against sort-circuit.
2. MCB is work quickly on overloading and under voltage.
3. MCB is reliable.
4. The performance of MCB's is good in case of earth leakage.

Disadvantage

1. The cost of MCB is greater than fuse
2. the cost of on MCB Distribution board is greater than rewire able fuse board

Application

Miniature circuit breakers are used to safeguard homes from overload. Due to their capacity to handle large amounts of electricity, they are much reliable and safer than a fuse. One of the greatest advantages of an MCB is that it ensures equal distribution of electrical energy across all the devices.

2. ELCB (Earth Leakage Circuit Breaker)

An Earth-leakage circuit breaker (ELCB) is a safety device used in electrical installations with high earth impedance to prevent shock. It detects small stray voltages on the metal enclosures of electrical equipment, and interrupts the circuit if a dangerous voltage is detected.

Figure 64 - ELCB

An ELCB (shown in fig.65) is a specialized type latching relay that has a building's incoming mains power connected through its switching contacts so that the ELCB disconnects the power when earth leakage is detected. The ELCB detects fault currents from live to the Earth (ground) wire within the installation it protects. Sufficient voltage appears across the ELCB's sense coil, it will switch off the power, and remain off until manually reset. A voltage-sensing ELCB does not sense fault currents from live to any other earthed body.

An ELCB is a specific type of latching relay that has a structure’s incoming mains power associated through its switching contacts so that the circuit breaker detaches the power in an unsafe condition. The ELCB notices fault currents of human or animal to the earth wire in the connection it guards. If ample voltage seems across the ELCB’s sense coil, it will turn off the power, and remain off until manually rearrange. A voltage sensing ELCB doesn’t detect fault currents from human or animal to the earth.

The ELCB notices fault currents of human or animal to the earth wire in the connection it guards. If ample voltage seems across the ELCB’s sense coil, it will turn off the power, and remain off until manually rearrange. A voltage sensing ELCB doesn’t detect fault currents from human or animal to the earth.

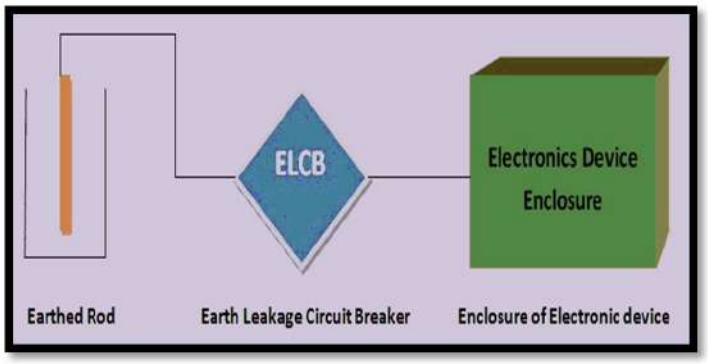


Figure 65 - Block Diagram of ELCB

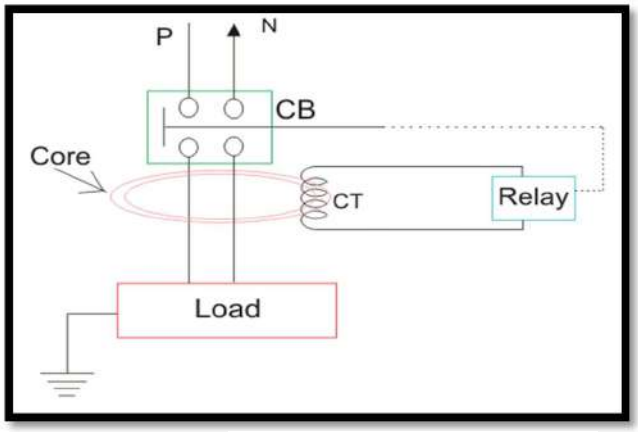


Figure 66 - Block Diagram How to Work

Advantages of ELCB

1. ELCBs are less sensitive to fault conditions and have few nuisance trips
2. While current and voltage on the ground line generally fault current from a live wire, this is not continuously the case, and therefore there are conditions in which an ELCB can annoyance trip.
3. When an installation of the electrical instrument has two contacts to earth, a near high current lightning attack will root a voltage gradient in the earth, offering the ELCB sense coil with sufficient voltage to source it to a trip.
4. If either of the soil wires become detached from the ELCB, it will no longer install will frequently no longer be correctly earthed
5. ELCBs are the necessity for a second connection and the opportunity that any extra connection to ground on the threatened system can inactivate the detector.

Disadvantages of ELCB

1. They do not sense errors that don't permit current through the CPC to the ground rod.
2. They do not permit an only building system to be simply divided into many sections with independent error protection because earthling systems are typically used mutual earth, Rod
3. ELCB present an extra resistance & an extra point of failure in the earthling system.

Cost-estimate of ELCB

The cost of earth leakage circuit breaker is approx. 300 to 500 Indian rupee.

Application of ELCB

An Earth-leakage circuit breaker (ELCB) is a safety device used in electrical installations with high Earth impedance to prevent shock. It detects small stray voltages on the metal enclosures of electrical equipment, and interrupts the circuit if a dangerous voltage is detected. Short-circuit protection is most useful and mandatory concept now a days we can see at Kunkni village some homes use old fuse In the main board ...so we get the idea that old concept of fuse is chip and risky so that we can change old fuse and replace to MCB (miniature circuit breaker) and ELCB (earth leakage circuit breaker) ELCB is useful when the don't earthing in the line so leakage current flows and short-circuit risk at that time so we can fit the ELCB. MCB is useful when the over voltage come in the line so MCB cutoff the line and no short-circuit risk at that time.

8.11 DESIGN: VERTICAL AXIS WIND TURBINE (VAWT)

The renewable energy can lower the prices of and demand for natural gas and coal by increasing competition and diversifying our energy supplies. And an increased reliance on renewable energy can help protect consumers when fossil fuel prices spike. So many types of renewable energy is available solar energy, Wind energy, Hydro energy, Tidal energy, geothermal energy, Biomass energy. Energy harvesting is useful as it offers a means of powering electronics where there are no conventional power sources. Also opens a lot of new applications in many remote locations, difficult-to-access locations and also underwater where batteries and conventional power are not practical to use.

Wind turbines do not release emissions that can pollute the air or water (with rare exceptions), and they do not require water for cooling. Wind turbines may also reduce the amount of electricity generation from fossil fuels, which results in lower total air pollution and carbon dioxide emissions. Wind power turbines come in handy in the market today. Vertical-axis wind turbine happens to be one of the most popular and widely coveted wind turbines. It is also more practical, reliable and cost effective with the best longevity and durability features. Therefore, it can be used efficiently over a long haul. The turbine is also designed in a unique way that enables it to work efficiently in an urban and suburban area.

The kinetic energy of the wind can be changed into other forms of energy, either mechanical energy or electrical energy. The kinetic energy contained in wind can be transferred to other objects, such as boat sails, or transformed into electrical energy through wind turbine generators. With the recent surge in fossil fuels prices, demands for cleaner energy sources, and government funding incentives, wind turbines are becoming a more viable technology for electrical power generation. The wind turbines are available in two variants: Horizontal-axis wind turbine (HAWT), Vertical-axis turbines (VAWT).

The horizontal axis wind turbine are generally used for commercial generation of electrical energy. They require large area for installation away from the city as they are noisy. As compared to HAWT, VAWT can be used for small scale generation of electrical energy.

The vertical axis wind turbine rotors are classified as Savonius, Darrieus and H-rotor. The use of VAWT makes it possible to locate the generator at the bottom of the tower. As the nacelle is

excluded from this type of turbine construction, the structural loads and cost in erecting the tower is reduced facilitating easy access of the generator and control system.

Main Components of VAWT generation

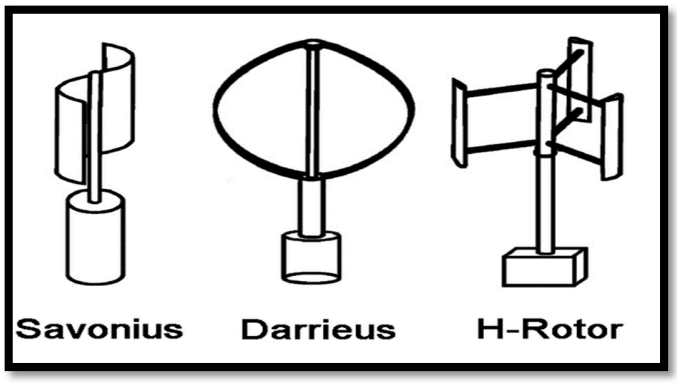


Figure 67 - Types of VAWT

Blade

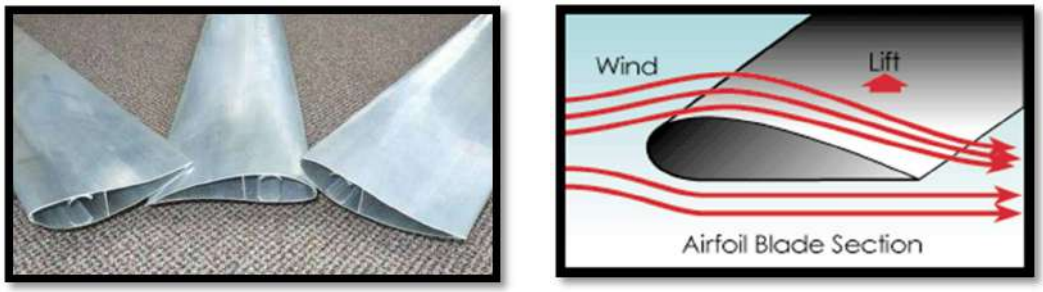


Figure 68 - Airfoil Section of Blade

Blade design is made of aluminum and epoxy resin this material use for our vertical axis wind turbine Aero dynamic blade made of carbon fiber (shown in fig.69) is light weight. Has a razor sharp edge. Which cut through the wind and make it virtually silent

Generator

The wind turbine rotates at a lesser speed than the generator. A step up gear box is provided in between the turbine and generator. By designing the generator with larger number of poles will have slow rotational speed? This will eliminate the mechanical losses and maintenance cost. The fixed speed squirrel cage induction generators are replaced by the doubly fed induction generators for achieving variable speed and the modern trend is the use of generators with permanent magnet rotors. Permanent magnet synchronous generator are preferably used as wind generators. Fig.69

The advancement in semiconductor devices has made possible to provide electronic commutation. This eliminates the use of brushes and mechanical commentator which reduces the maintenance and increase the life of drive.

Wind turbines operate on a simple principle. The energy in the wind turns two or three propeller-like blades around a rotor. The rotor is connected to the main shaft, which spins a generator to create electricity. Wind turbines convert the kinetic energy in the wind into mechanical power.

This mechanical power can be used for specific tasks (such as grinding grain or pumping water) or a generator can convert this mechanical power into electricity. Fig. 70, 71.

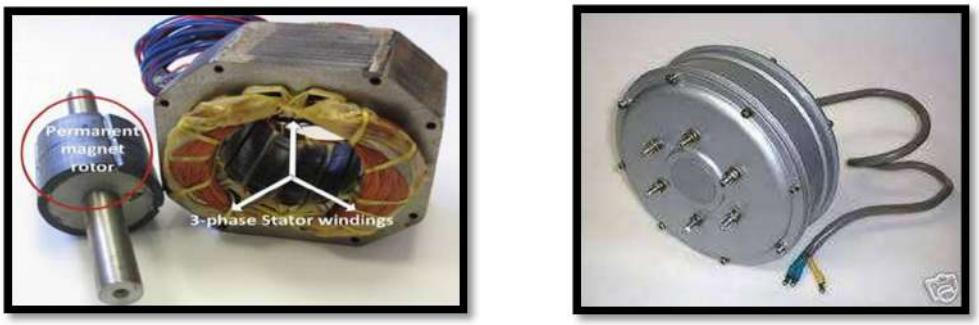


Figure 69 - Permanent Magnet Generator

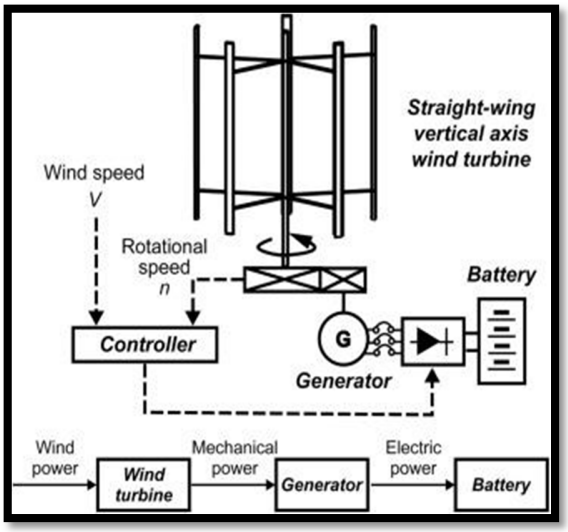


Figure 70- Block Diagram of H-Rotor VAWT

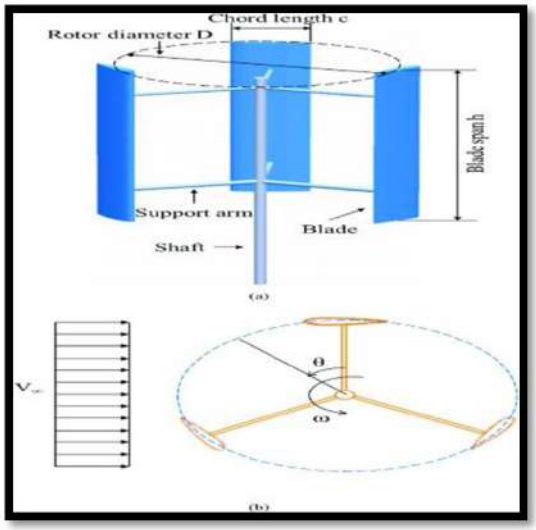


Figure 71 - Design of Vertical Axis Wind Turbine

The total quantum of wind energy is enormous. However, a very small percentage is available for practical use.

Efficiency of wind-turbine energy conversion plants is only about 30%. The power in the wind is proportional to the wind speed cubed; General formula for power in the wind is:

Power = density of air x swept area x (velocity) ^{3} x power co-efficient/2

$$P = \rho A v^3 C_p / 2$$

where, P is the absorbed power, CP is the power coefficient (which is a function of the tip speed ratio, TSR, ρ is the density of the air, A is the cross section area of the turbine and v is the wind speed. The power coefficient CP, states how big part of the power in the wind that is absorbed by a wind turbine. The theoretical maximum value of CP for a HAWT is 16/27 ≈ 0.59 is known as Beltz limit. The power in the wind is proportional to the wind speed cubed, so if the wind speed is increased, the wind power is increased more. Therefore, the amount of power available for a wind turbine is highly variable.

The power coefficient, CP, is a function of the tip speed ratio, TSR, which is the ratio between the blade tip speeds to the wind speed,

$TSR = \omega_{mech} R_0 / v$

Where ω_{mech} is the rotational speed of the turbine, R_0 is the turbine radius and v is the wind speed. A HAWT is normally operated at a tip speed ratio of 5-7. A VAWT normally has a lower tip speed ratio.

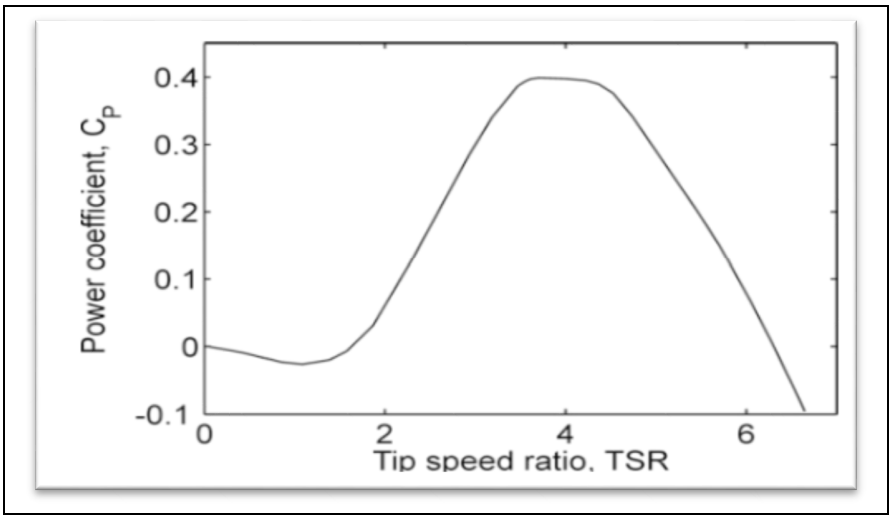


Figure 72 - C_p as a Function of TSR

A CP-TSR curve can be seen in fig.72. The turbine should be operated at optimum tip speed ratio for maximized power absorption, as can be seen in fig.72. If the tip speed ratio decreases an aerodynamic phenomena called stall will occur, where eddies will develop at the blade tip. The blade therefore absorbs less power, which explains why the CP-TSR curve goes down.

For a VAWT, where each blade sweeps the cross section area twice, the solidity (σ_o) is defined as below

σ_0, VAWT $= N_{BC0} / R_0$

If VAWT has a low solidity it is not self-starting this can be seen in fig.72 by observing that the C_P goes down below zero for low TSR values, i.e. energy needs to be supplied for the turbine to start rotating. The start-up of a VAWT can be achieved in several ways, for instance by having pitch able blades.

1. Sweep area of the turbine

VAWT: A = D * H

L is the blade length - the radius of the horizontal-axis turbine

D is the diameter

H is the turbine height

2. Calculate the available wind power

$P_{wind} = 0.5 * \rho * v^3 * A$

Where, A is the sweep area ρ is the air density, assumed to be 1.225 kg/m³ by default (you can change it in advanced mode) v is the wind speed - the typical usable range is approximately 3-25 m/s Pwind is the available wind power

3. Finding the efficiency of the turbine

You can find the total efficiency of the turbine as follows:

$\mu = (1 - k_m) * (1 - k_e) * (1 – ke,t) *(1 - kt) * (1 - kw) * C_p$

Where, C_p is the turbine efficiency. It must be lower than the Betz limit (59.3%), and is typically between 30-40%

kw are the wake losses due to neighboring turbines and the terrain topography, typically 3-10%

k_m are the mechanical losses of the blades and gearbox, typically 0-0.3%

k_e are the electrical losses of the turbine, typically 1-1.5%

ke,t are the electrical losses of transmission to grid, typically 3-10%

kt is the percentage of time out of order due to failure or maintenance, typically 2-3%

μ is the real efficiency

Efficiency is usually expressed as a percentage, but you input it into the formula as a fraction (for example, 30% = 0.3).

4. Calculating the output power

To find the wind turbine power, simply multiply the efficiency by the wind power available: Poutput = μ * Pwind

Main features of VAWT

1. Safety: Adopting the vertical blades and triangle double supporting point design. Solving the blades fracture, fall off, fly out of the problems.

2. Anti-wind Capability: Horizontal rotating and triangle double supporting point principle, can resist 45m/s super typhoon

3. Turning Radius: Different design structure and operation principle, make it has a smaller turning radius, saved the space and improve the efficiency.

4. Special Energy Output: Starting wind speed is lower than other wind turbines, power rise somewhat flat, so the generating capacity is 10%~30% higher than other wind turbine in 5m/s~8m/s.

5. Range of wind speed : adopting the special control principle make it suitable range of wind speed expand 2.5 to 25 m/s, so it can get the better generated energy and enhance the economic efficiency of wind power equipment based on using wind power resource furthest.

6. Braking: Blade itself with a revolving speed protection function, also braked by electronic auto brake or mechanical manual way, need only set manual brake in the no typhoon and strong wind area.

7. Operating maintenance: Adopting the direct-drive wind power generation without gear case and turning structure, but need to inspect the moving parts.

Advantage

1. Accepts wind from any angle.
2. Better answer to rapidly changing winds.
3. Components can be mounted at ground level
4. Ease of service
5. Lighter weight towers
6. Virtually silent operation.

Disadvantages

1. Less Rotation Efficiency
2. .Lower Available Wind Speed.

Estimate/cost

Estimate cost of vertical axis wind turbine of 5kw is 1,70,000/- Indian rupee and for 10kw - 2,50,000/- rupee

Application

The main objective of the generator is to transform the mechanical energy captured by the rotor of the wind turbine into electrical energy that will be injected into the utility grid. Asynchronous generators are commonly used in wind turbine applications with fixed speed or variable speed control strategies.

CHAPTER 9. PROPOSING DESIGNS FOR FUTURE DEVELOPMENT OF THE VILLAGE FOR THE PART-II DESIGN

Reconstruction of the panchayat building.

As the space is less so, no washrooms/toilet facility available in it, store is also not there.

Providing general store i.e. grocery store, medical store, etc.

There is no general store or medical shop there they have to visit to near village or city, no grocery store-vendors come to sell, to develop or give design for the villagers; so they won't have to go far.

Bus stand.

No public transport system is available and no bus stand is there for them to wait for bus.

Reconstruction of the milk dairy.

The existing milk dairy is not properly developed so reconstruction of it and adding more room for agriculture committee.

Computer classes with cyber café.

Students and all age group people can learn and developed their as well village economic status

Agriculture co-operative society.

Modern techniques and farming techniques are guided and various other work are carried out.

Smart Street light.

No Street light is there hardly one or two in the beginning and in the end, so for easy movement during night time solar street light is providing.

Automated solar grass cutter.

In present generation grass cutter machines are becoming very popular today. Pollution is manmade, which we can be seen in our daily life.

LPG gas leakage detector.

To stop accidents associated with the gas leakage is to install a gas leakage detection kit at vulnerable places. The aim of this paper is to propose and discuss a design of a gas leakage detection system that can automatically detect, alert and control gas leakage. This proposed system also includes an alerting system for the users. The system is based on a sensor that easily detects a gas leakage.

CHAPTER 10. CONCLUSION OF THE ENTIRE ACTIVITIES OF THE VILLAGE PROJECT

- Vishwakarma Yojana aims to grow villages by offering urban facilities without changing their souls. We contribute to the development of the country through the development of the villages. Until and unless the villages are not established, the country remains underdeveloped, so through Vishwakarma Yojana, we young engineers try to reduce the distance between urban and rural areas by developing suitable plans and proposals.
- Main Smart Aim: ―Developing village with a rural soul 'but with all Smart urban amenities that a city may have‖. This will help in developing Smart villages in sustainable manner, reduce migration from villages and prevent the cities from the urban pressure.
- This should lead to some rethinking about the meaning of efficiency beyond the usual conceptions of economic or technical efficiency. Ideal Village can solve its own problem and can also become a smart village example for another village.
- By carrying out a gap analysis, we have defined the gap between current facilities and facilities that are currently needed in accordance with the requirements and will recommend sustainable plans and solutions to fill these gaps and contribute to the growth of the village.
- Low cost toilet are also used by the public and the visitors of that village or by passing the village. It is given where the space is available and it occupy very less space.
- Anganwadi is reconstructed as per their demand and the ratio of the children.
- The basic health facilities are also provided by constructing health center. Basic treatment and medicine are also available to them in the health center so that they don't have to go far for health checkup or medicine.
- The project aims at reducing the heavy power and revenue loss that occur due to power theft by the consumers. The proposed system will be hidden in meters and as soon as an attempt is made for the theft, it will send a SMS using GSM modem, by displaying the respective consumer meter number to control unit of electricity board. Thus by the above mentioned design we can successfully and effectively address the problems related to power theft.
- Short-circuit protection is most useful and mandatory concept now a days. we can see at kunkni village some homes use old fuse In the main board ...so we get the idea that old concept of fuse is chip and risky so that we can change old fuse and replace to MCB (miniature circuit breaker) and ELCB (earth leakage circuit breaker) ELCB is useful when the don't earthing in the line so leakage current flows and short-circuit risk at that time so we can fit the ELCB. MCB is useful when the over voltage come in the line so MCB cutoff the line and no short-circuit risk at that time.
- Stand-alone vertical axis wind turbines are typically used for water pumping or use in agriculture. However, homeowners, farmers, and ranchers in windy areas can also use wind turbines as a way to cut their electric bills. Small wind systems also have potential as distributed energy resources. Vertical axis turbines are primarily used in small wind projects and residential applications.

11. REFERENCES REFEREED FOR THIS PROJECT

- http://www.onefivenine.com/india/villages/Surat/Olpad/Kunkni
- https://www.census2011.co.in/data/village/523781-kunkni-gujarat.html
- http://smartvillages.org/Objectives.aspx
- https://india.gov.in/topics/rural
- https://www.wbdg.org/space-types/clinic-health-unit
- https://www.researchgate.net/publication/328215652_Role_of_indigenous_technologies_in_relation_to_capability_approach_and_human_development_of_Indigenous_Peoples
- http://centrallibrary.cit.ac.in/dir/Project%20Report/2019/BTech/CE/ANALYSIS%20AND%20DESIGN%20OF%20R.C.C.%20OVERHEAD%20TANK.pdf
- https://iopscience.iop.org/article/10.1088/1757-899X/397/1/012104/pdf
- https://www.thebetterindia.com/21508/a-low-cost-stp-that-treats-water-without-chemicals-or-electricity-is-helping-communities-save-lakhs/
- "Controlling elrctricity theft and improving revenue" World Bank report on reforming the power sector, 2010.
- A.S Metering S. Visalatchi and K K Sandeep, "smart energy metering and power theft control using arduino & amp, GSM " 2nd international coference for convergence in technology mumbai ,2017,pp. 858-961.
- MCB photos from google photos
- ELCB photos from google photos
- MCB/ELCB detail https://www.elprocus.com/difference-between-mcb-mccb-elcb-rccb/
- VAWT photos from google photos
- https://www.windpowerengineering.com/vertical-axis-wind-turbine-technology-continues-improve/
- https://www.motherearthnews.com/renewable-energy/vertical-axis-wind-turbines-zmaz08fmzmcc
- BOOK – For Estimating and Costing Professional Practice and Valuation: by Dr. R.P. Rethaliya, Edition: 2017-2018, Atul Prakashan.
- BOOK - Irrigation water resource and water power engineering: by Dr. P.N. Modi, Standard book house: Rajsons publications Pvt. Ltd.

12. ANNEXURE

12.1 Survey form of Ideal Village Scanned copy attachment in the report for Part-I

Gujarat Technological University, Ahmedabad, Gujarat | Vishwakarma Yojana: Phase VIII Techno Economic Survey

Techno Economic Survey

For

Vishwakarma Yojana: Phase VIII

IDEAL VILLAGE SURVEY

An approach towards Rurbanisation for Village Development

Name of Village:	ENA
Name of Taluka:	~~Bardoli~~ / Palsana.
Name of District:	Surat
Name of Institute:	C.K. Pithawala College of Engg. & Tech.
Nodal Officer Name & Contact Detail:	Boski Chauhan & Rehal Jivanjeewala. 9898865266
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Nayanaben Pihayi (~~Sarpanch~~ - 8469665835)
Date of Survey:	5/10/2020

તલાટી કમ મંત્રી
એના-ગોદીયા જુથ ગામ પંચાયત
તા. પલસાણા, જિ. સુરત

1. Demographical Detail:

Sr. No.	Census	Population	Male	Female	Total House Holds
i)	2001	4198	2356	1842	925
ii)	2011	3777	1695	1882	888

2. Geographical Detail:

Sr. No.	Description	Information/Detail
i)	Area of Village (Approx.) (In Hector) Coordinates for Location:	622 hectare
	Forest Area (In hect.)	18 hectare
	Agricultural Land Area (In hect.)	Not specified
	Residential Area (In hect.)	614 hect.
	Other Area (In hect.)	-
	Water bodies	Canal
	Nearest Town with Distance:	Surat - 25 km.

Scanned with CamScanner

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

3. Occupational Details:

Name of Three Major Occupation groups in Village	1. Agriculture (Sugarcane, Banana) 2. Job (In town) 3.

4. Physical Infrastructure Facilities:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
	• Tap Water (Treated/ Untreated)	Treated	Yes		
	• RO Water	Not available	–		
	• Well (Covered/ Uncovered)	Not available	–		
	• Hand pumps	• Yes	17-15 No.	Partially	
	• Tube well/ Borehole	Yes available			
	• River/ Canal/ Spring/ Lake/ Pond	Canal for irrigation	Yes		
	Suggestions if any:				
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	Yes	No-1	
	Underground Sump	Capacity:	Not available		
	Suggestions if any:				
C.	**Drainage Facility**				
	Available (Yes/ No)	Yes	Door to Door		
	Suggestions if any:				
D.	**Type of Drainage**				
	Closed/ Open	Closed			
	If Open than Pucca / Kutchcha	Pucca 100%			
	Whether drain water is discharged directly in to Water bodies/ Sewer plants	Discharged through Sewage Plant			
	Suggestions if any:				

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

E.	Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM				
	Village approach road	Along Highway (Block-GM Road)			
	Main road	WBM			
	Internal streets	Block			
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH 53 (2-3 km)			
Suggestions if any:					
F.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Baben Railway station (10-15 km distance)			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Yes (in the village 0 km distance)			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Auto - Private vehicles, Bus, Rickshaw			
Suggestions if any:					
G.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	DGBCL	Sufficient, No Power cut Problem		
	Power supply for Domestic Use	Yes	Sufficient		
	Power supply for Agricultural Use	Yes			
	Power supply for Commercial Use	Yes	Sufficient		
	Road/ Street Lights	Yes			

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Electrification in Government Buildings/ Schools/ Hospitals	Yes there is available in hospitals	CCTV Available Yes		
	Renewable Energy Source Facilities (Y/ N)	Yes 100% complete			
	LED Facilities	Yes			

Suggestions if any:

II.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	Yes available 2			
	Location Condition	within 1km Extendy good			
	Community Toilet (With bath/ without bath facilities)	Yes			
	Solid & liquid waste Disposal system available	Dumping Site within 1km			
	Any facility for Waste collection from road	Door to door			

Suggestions if any:

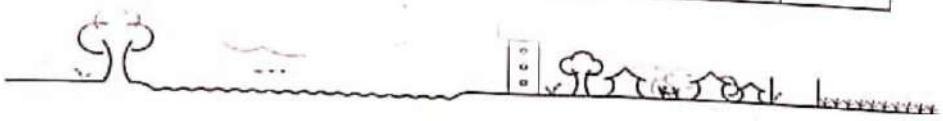
I.	**Irrigation Facility:**				
	Main Source of Irrigation (Stream/River/ Canal/ Well/ Tube well/ Other)	Canal			

Suggestions if any:

J.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	90% Pucca road			

5. **Social Infrastructural Facilities:**

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

K.	Health Facilities:					
	Sub center/ PHC/ CHC /Government Hospital/ Child welfare & Maternity Homes (If Yes than specify No. of Beds) Condition:	PHC			Introducing Pandal Thakre's a public health center in village.	
	Private Clinic/Private Hospital/ Nursing Home	3				
	If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:						
L.	Education Facilities:					
	Aaganwadi/ Play group	Available	Very Good Condition	1 no		
	Primary School	Available	Very Good Condition	1 no		
	Secondary school	Available	Good Condition	1 no		
	Higher sec. School	Available	Good Condition	1 no		
	ITI college/ vocational Training Center	Available	Good Condition	1 no		
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities					
	If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:						
M.	Socio- Culture Facilities					
	Community Hall (With or without TV) Location:	Without TV within 100 m Very good Condition				

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Condition:	Good condition			
	Public Library (With daily newspaper supply: Y/N) Location: Condition:	Yes, included School 150 m Good available			
	Public Garden Location: Condition:	Yes 0 km Very good Condition			
	Village Pond Location: Condition:	Yes 0.5 km Very good Condition			Rain Water.
	Recreation Center Location: Condition:	Not available 1-2 km from village Avg.			
	Cinema/ Video Hall Location: Condition:	Not available 1-2 km from village Avg.			
	Assembly Polling Station Location: Condition:	Yes			
	Birth & Death Registration Office Location: Condition:	Yes in Gram Panchayat			
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					
N.	**Other Facilities**				
	Post-office	Yes.			
	Telecommunication Network/ STD booth	Network issue (JIO)			

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

General Market	Available			
Shops (Public Distribution System)	Yes			
Panchayat Building	Yes			
Pharmacy/Medical Shop	Yes within	0.5km.		
Bank & ATM Facility	Yes	3 km		
Agriculture Co-operative Society	No			
Milk Co-operative Soc.	Yes			
Small Scale Industries	Yes	No.		
Internet Cafes/ Common Service Center/Wi Fi	No			
Other Facility	cricket ground.			
Suggestions if any:				

6. **Sustainable /Green Infrastructure Facilities:**

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
O.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Solar Energy (Limited)			
P.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	No Yes (Limited) No.			
Q.	Any Other				

7. **Data Collection From Village**

Village Base Map Available: Hard Copy/Soft Copy	

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VI
Techno Economic Survey

Recent Projects going on for Development of Village	Gramiyarod (development)
Any NGO working for village development	1 [Hope foundation]

8. **Additional Information/ Requirement:**

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities(School Building, Health Center, Panchayat Building, Public Toilets & any other)	English medium school. [Sardar Patel]	
2.	Additional Information/ Requirement		

9. **Smart Village Proposal Design**

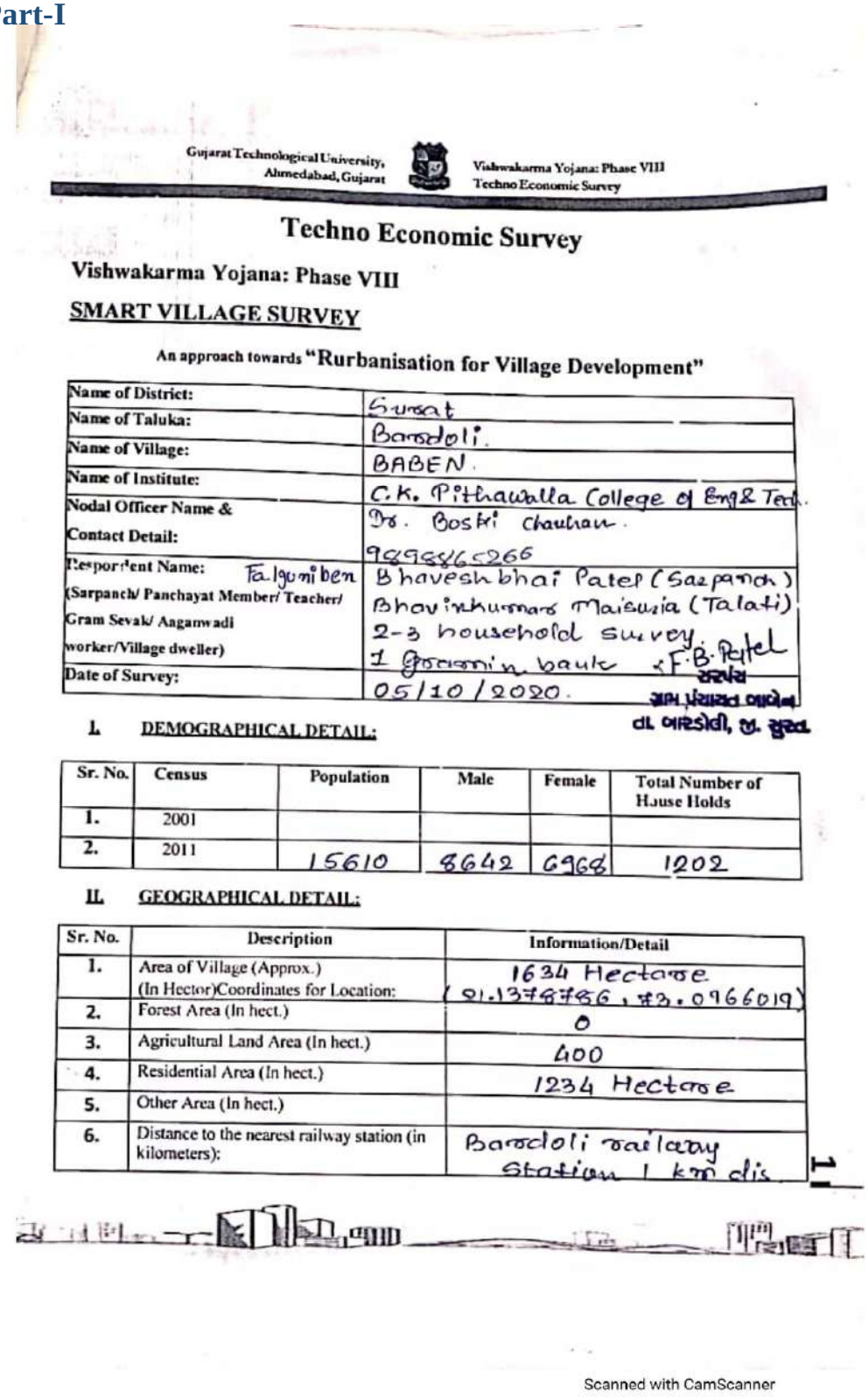
Sr. No.	Descriptions	Information/ Detail	Remarks
1.			

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section:
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

તલાટી કમ મંત્રી
એવા-[illegible] ગ્રામ પંચાયત
[illegible], જિ. સુરત

12.2 Survey form of Smart Village Scanned copy attachment in the report for Part-I



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

SMART VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

Name of District:	Surat
Name of Taluka:	Bardoli.
Name of Village:	BABEN.
Name of Institute:	C.K. Pithawalla College of Eng & Tech.
Nodal Officer Name & Contact Detail:	Dr. Boski Chauhan. 9898865266
Respondent Name: Falgunibeen (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	Bhaveshbhai Patel (Sarpanch) Bhavinkumar Maisuria (Talati) 2-3 household survey. 1 Gramin bank F.B. Patel
Date of Survey:	05/10/2020.

I. **DEMOGRAPHICAL DETAIL:**

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001				
2.	2011	15610	8642	6968	1202

II. **GEOGRAPHICAL DETAIL:**

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector) Coordinates for Location:	1634 Hectare (21.137887856, 73.0966019)
2.	Forest Area (In hect.)	0
3.	Agricultural Land Area (In hect.)	400
4.	Residential Area (In hect.)	1234 Hectare
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	Bardoli railway station 1 km dis

Scanned with CamScanner

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

7.	Name of Nearest Town with Distance:	Bardoli (9.1 km) Surat (40 km)
8.	Distance to the nearest bus station (in kilometers):	Bardoli OLD bus station (1.9 km)
9.	Whether village is connected to all road for the any facility or town or City?	Yes, NH 53 connected to surat

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Farming (6955 ppl)
	2. Home-Domestic (65)
	3. Labour (1071)

Major crops grown in the village:	1. Sugercane
	2.
	3.

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	PIPED WATER Piped Into Dwelling Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well	Yes.	Yes, 350 ha. covered by tube & bore		- village individual water committee. - chlorination, clearness, colour done be Panchayat.
2.	DUG WELL. Protected Well Un Protected Well	✓			- Animal water facility 'Havada' ([illegible])
3.	WATER FROM SPRING Protected Spring Unprotected Spring Rainwater Tanker Truck Cart With Small Tank	NO water from spring.			- Board name [illegible] 31 lakh by Gujarat government
4.	SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/ Irrigation Channel Bottled Water Hand Pump Other(Specify)Lake/ Pond	950 ha no: 5 Yes	Irrigation done by Canal & Lake		

21

Scanned with CamScanner

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:

B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	no: 6	Lt.-5 m	
	Underground Sump	Capacity:			
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE	yes			
	1	Ondergro[illegible] · 1 no			
	2	Pucca closed		2 nos	
	B. OPEN WITH OUTLET	Pucca open		3 nos	
	C. OPEN WITHOUT OUTLET	Open		4 nos	
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	Pucca cemented			Opening gates every streets
	Main road	Pucca cement &	Footpath road		
	Internal streets	Pucca rd. & Brick			
	Nearest NH/SH/MDR/ODR Dist. in kms.	NH 53 (2-3 km)			
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	Bardoli railway Station	2 km dis.		
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	Bardoli OLD Bus stati	1.2 km dis.		
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Private vehi:			
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Yes,	More then 6 hrs.		

3

Scanned with CamScanner

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Power supply for Domestic Use	69 ± connection	Yes		
	Power supply for Agricultural Use	150 connection	Yes		
	Power supply for Commercial Use	250 connection	Yes.		
	Road/ Street Lights	100 %.	Solar Stars.		
	Electrification in Government Buildings/ Schools/ Hospitals	100 %.	Yes.		
	Renewable Energy Source Facilities (Y/ N)	Yes.			
	LED Facilities	100 %.	Yes.		

Suggestions if any:

G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	2 nos.	Yes.		- Collect waste by dustbin and - Send municipal corporation to make vermicompost and boring against to set it.
	Location Condition	Good.			
	Community Toilet (With bath/ without bath facilities)	Without Bath			
	Solid & liquid waste Disposal system available	Yes.	Available		
	Any facility for Waste collection from road	Dustbin by Panchayat.			

Suggestions if any:

H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	Lake, canal & tube well around 700 ha			

Suggestions if any:

I.	**Housing Condition:**				
	Kutchha/Pucca (Approx. ratio)	100 % pucca			

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi)	8 nos			- In house 2 anganwadi.
	Sub-Centre	Yes.			
	PHC				
	BLOCK PHC	Yes.			- Total 5 anganwadi available
	CHC/RH				
	District/ Govt. Hospital	Yes.			- 100% vaccination by PHC
	Govt. Dispensary				
	Private Clinic	Yes.			
	Private Hospital/ Nursing Home	Maternity hospital			
	AYUSH Health Facility				
	sonography /ultrasound facility	1			
	If any of the above Facility is not available in village than approx. distance from village: .0.....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	7 gov.			Lunch at sch
	Primary School	1			
	Secondary school	1			
	Higher sec. School	1			
	ITI college/ vocational Training Center	7 diffrad			
	Art, Commerce& ~~Science~~ /~~Polytechnic~~/ Engineering/ Medical/ Management/ ~~other college~~ facilities				
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				

51

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Suggestions if any:

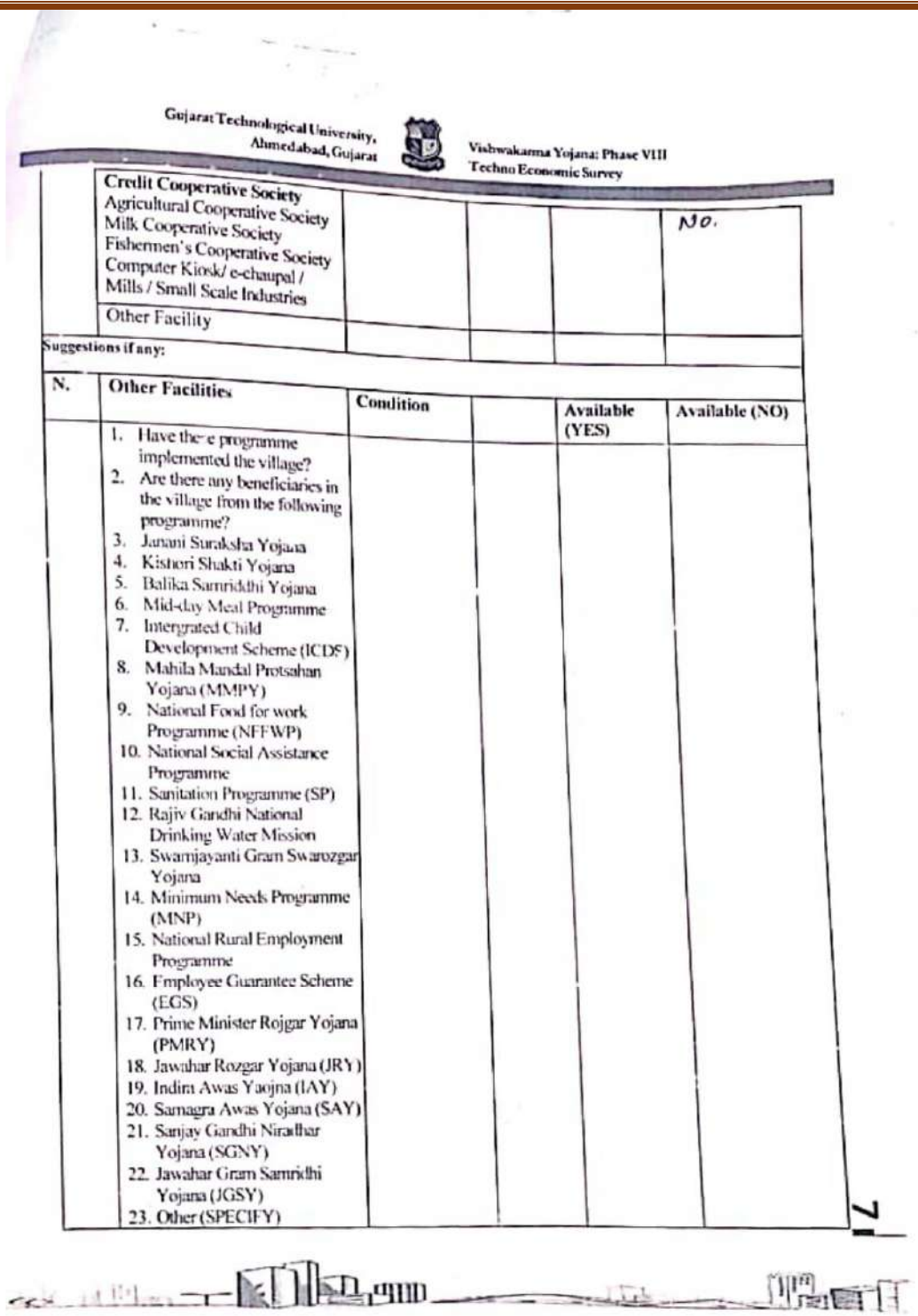
L.	Socio- Culture Facilities	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)				✓
	Public Library (With daily newspaper supply: Y/N)			Newspaper Supply	✓
	Public Garden	Good	In village	✓	
	Village Pond	Good	"	✓	
	Recreation Center			✓	
	Cinema/ Video Hall				✓
	Assembly Polling Station				✓
	Birth & Death Registration		At Panchayat	✓	

If any of the above Facility is not available in village than approx. distance from village: 4.5 kms.

Suggestions if any:

M.	Other Facilities	Condition	Location	Available (YES)	Available (NO)
	Post-office	Good.	Village	✓	
	Telecommunication Network/ STD booth	Avg.		✓	
	General Market	Good.	0.5 km	✓	
	Shops (Public Distribution System)	Avg.	0 km	✓	
	Panchayat Building	Advance		✓	
	Pharmacy/Medical Shop	1 no		✓	
	Bank & ATM Facility	4 no.	In village	✓	
	Agriculture Co-operative Society				✓
	Milk Co-operative Soc.				✓
	Small Scale Industries	Domestic.		✓	
	Internet Cafes/ Common Service Center/Wi Fi				✓
	Youth Club				✓
	Mahila Mandal				✓

19



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries				NO.
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village?				
	2. Are there any beneficiaries in the village from the following programme?				
	3. Janani Suraksha Yojana				
	4. Kishori Shakti Yojana				
	5. Balika Samriddhi Yojana				
	6. Mid-day Meal Programme				
	7. Intergrated Child Development Scheme (ICDS)				
	8. Mahila Mandal Protsahan Yojana (MMPY)				
	9. National Food for work Programme (NFFWP)				
	10. National Social Assistance Programme				
	11. Sanitation Programme (SP)				
	12. Rajiv Gandhi National Drinking Water Mission				
	13. Swarnjayanti Gram Swarozgar Yojana				
	14. Minimum Needs Programme (MNP)				
	15. National Rural Employment Programme				
	16. Employee Guarantee Scheme (EGS)				
	17. Prime Minister Rojgar Yojana (PMRY)				
	18. Jawahar Rozgar Yojana (JRY)				
	19. Indira Awas Yaojna (IAY)				
	20. Samagra Awas Yojana (SAY)				
	21. Sanjay Gandhi Niradhar Yojana (SGNY)				
	22. Jawahar Gram Samridhi Yojana (JGSY)				
	23. Other (SPECIFY)				

7

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	Yes, Solar Fund (Pri + Govt.)			
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	No. Yes No.			
3.	Any Other				

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Attached below			
2.	Recent Projects going on for Development of Village	No.			
3.	Any NGO working for village development	No.			
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	No.			

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks

8

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

1.	Repair & Maintenance of Existing Public Infrastructure facilities, School Building Health Center Panchayat Building Public Toilets & any other	All done by Gram Panchayat	
2.	Additional Information/ Requirement		
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?		

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?		

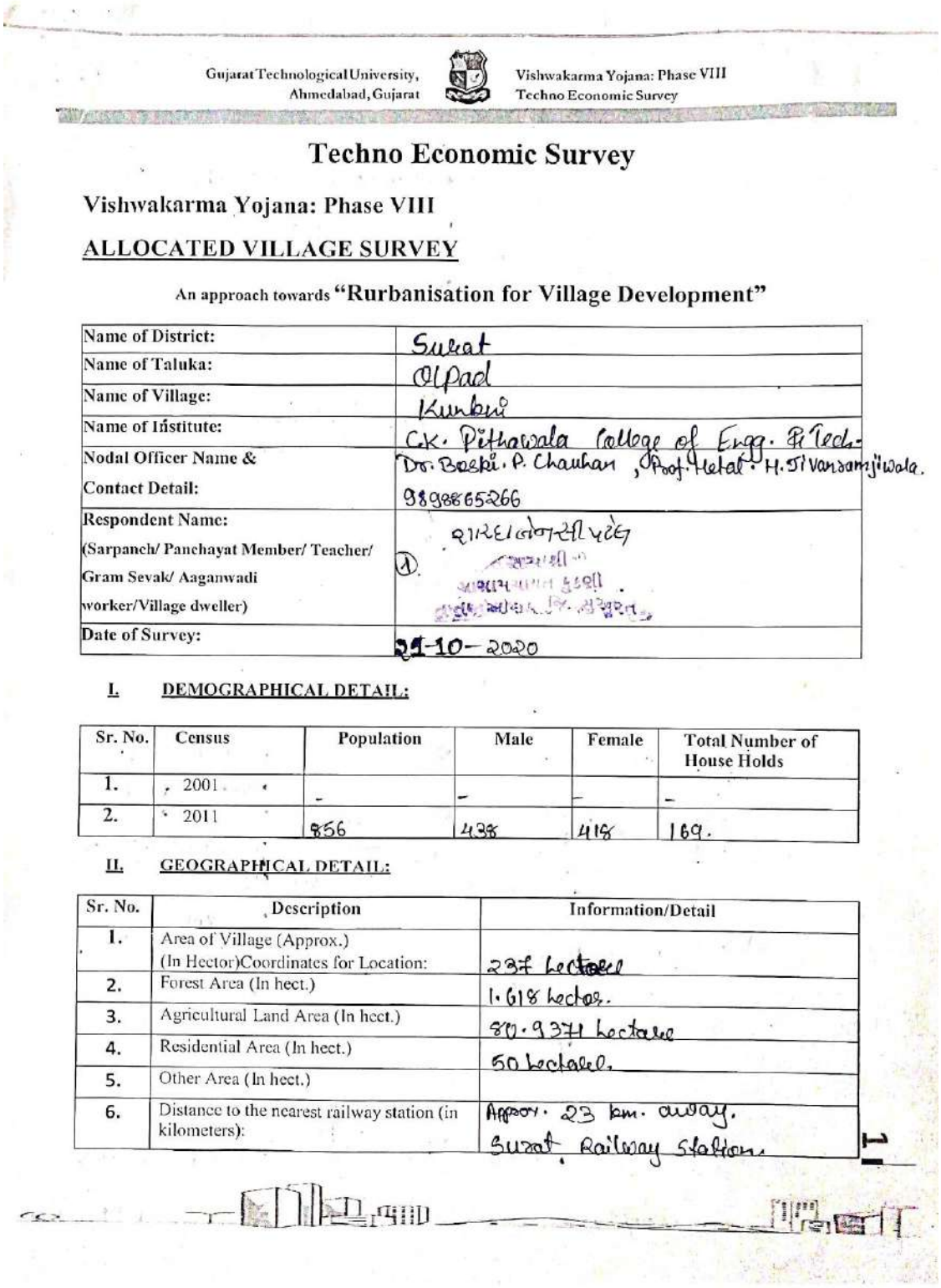
Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

As Respondent

F.B.Patel
સરપંચ
ગ્રામ પંચાયત બારોબ
તા. બારડોલી, જી. સુરત.

12.3 Survey form of Allocated Village Scanned copy attachment in the report for Part-I



Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

Techno Economic Survey

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards **"Rurbanisation for Village Development"**

Name of District:	Surat
Name of Taluka:	Olpad
Name of Village:	Kunkni
Name of Institute:	C.K. Pithawala College of Engg. & Tech.
Nodal Officer Name & Contact Detail:	Dr. Baski. P. Chauhan, Prof. Hetal. H. Jivansanjivala. 9898865266
Respondent Name: (Sarpanch/ Panchayat Member/ Teacher/ Gram Sevak/ Aaganwadi worker/Village dweller)	①
Date of Survey:	21-10-2020

I. DEMOGRAPHICAL DETAIL:

Sr. No.	Census	Population	Male	Female	Total Number of House Holds
1.	2001	-	-	-	-
2.	2011	856	438	418	169.

II. GEOGRAPHICAL DETAIL:

Sr. No.	Description	Information/Detail
1.	Area of Village (Approx.) (In Hector)Coordinates for Location:	237 hectares
2.	Forest Area (In hect.)	1.618 hectar.
3.	Agricultural Land Area (In hect.)	80.9371 hectare
4.	Residential Area (In hect.)	50 hectare.
5.	Other Area (In hect.)	
6.	Distance to the nearest railway station (in kilometers):	Appox. 23 km. away. Surat Railway station.

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Techno Economic Survey

7.	Name of Nearest Town with Distance:	Surat - 18 km Ariyana Village - 3-4 km.
8.	Distance to the nearest bus station (in kilometers):	No bus station.
9.	Whether village is connected to all road for the any facility or town or City?	yes.

III. OCCUPATIONAL DETAILS:

Name of Three Major Occupation groups in Village	1. Farming 2. Job (Service, Sector (Govt)) 3. Milk Society.

Farming for land 25-30 jol.

Major crops grown in the village:	1. Rice 2. Sugarcane 3.

IV. PHYSICAL INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Detail	Adequate	Inadequate	Remarks
A.	**Main Source of Drinking water**				
1.	**PIPED WATER** Piped Into Dwelling Piped To Yard/Plot Public Tap/Standpipe Tube Well Or Bore Well	 yes No	Yes yes		Fresh water for drinking purpose is needed.
2.	**DUG WELL** Protected Well Un Protected Well	yes (Protect well)		Inadequate	Chlorination maintain by Panchayat.
3.	**WATER FROM SPRING** Protected Spring Unprotected Spring Rainwater Tanker Truck Cart With Small Tank	 No water from spring		Inadequate	For animals Havada is there.
4.	**SURFACE WATER (RIVER/DAM/ LAKE/POND/STREAM/CANAL/** Irrigation Channel Bottled Water Hand Pump	yes. (Lake) Not in use	 500.	 Irrigation done by canal	 Handpump Not in use.

Gujarat Technological University, Ahmedabad, Gujarat — Vishwakarma Yojana: Phase VIII Techno Economic Survey

	Other(Specify)Lake/ Pond	Lake (divide in 2 part)	Adequate		Water for cultivation is used from lake when needed & for animals
Suggestions if any:					
B.	**Water Tank Facility**				
	Overhead Tank	Capacity:	1	Not in use.	Approx. 10000
	Underground Sump	Capacity:	0		
Suggestions if any:					
C.	**The Type of Drainage Facility**				
	A. UNDERGROUND DRAINAGE 1	Yes	50% houses have been provided.		Open drain is there. And from which waste-water is drawn in canal.
Suggestions if any:					
D.	**Road Network :All Weather/ Kutchha (Gravel)/ Black Topped pucca/ WBM**				
	Village approach road	WBM			Rd. need to be repaire and made up of single material for easy going & better route.
	Main road	Bituminous			
	Internal streets	Cemented Concrete, blocks.			
	Nearest NH/SH/MDR/ODR Dist. in kms.				
Suggestions if any:					
E.	**Transport Facility**				
	Railway Station (Y/N) (If No than Nearest Rly Station---Kms)	NO			
	Bus station (Y/N) Condition: (If No than Nearest Bus Station---Kms)	NO.			
	Local Transportation (Auto/ Jeep/Chhakda/ Private Vehicles/ Other)	Private vehicle			2-wheeler, 4-wheeler, Tractor.
Suggestions if any:					
F.	**Electricity Distribution**				
	(Y/N) Govt./ Private (Less than 6 hrs./ More Than 6 hrs)	Govt. 24x7	Yes		GEB, Once a week there is Power Breakdown.

3

Gujarat Technological University, Ahmedabad, Gujarat — Vishwakarma Yojana: Phase VIII, Techno Economic Survey

	Power supply for Domestic Use	Gout	Yes		24*7 available.
	Power supply for Agricultural Use	Yes.	Yes		8 hrs in all season & free labo too.
	Power supply for Commercial Use	No.			
	Road/ Street Lights	Yes		Yes	2-3 ~~Street lights~~ are only there.
	Electrification in Government Buildings/ Schools/ Hospitals	No			only in school. available.
	Renewable Energy Source Facilities (Y/ N)	no. Yes - Privately used.			Solar Panels are there
	LED Facilities	Yes.			Need of LED lamps.
Suggestions if any:					
G.	**Sanitation Facility**				
	Public Latrine Blocks If available than Nos.	No			
	Location Condition	No			
	Community Toilet (With bath/ without bath facilities)	No			
	Solid & liquid waste Disposal system available	No			Fare disposing place - 5km away at Panchayat place.
	Any facility for Waste collection from road	No			
Suggestions if any:					
H.	**Main Source of Irrigation Facility:**				
	TANK/POND STREAM/RIVER CANAL WELL TUBE WELL OTHER (SPECIFY)	Yes & No. of well			Well Not in used.
Suggestions if any:					
I.	**Housing Condition:**				
	~~Kutchha~~/Pucca (Approx. ratio)				

4

V. SOCIAL INFRASTRUCTURAL FACILITIES:

Sr. No.	Descriptions	Information/ Detail	Adequate	Inadequate	Remarks
J.	**Health Facilities:**				
	ICDS (Anganwadi) Sub-Centre PHC BLOCK PHC CHC/RH District/ Govt. Hospital Govt. Dispensary Private Clinic Private Hospital/ Nursing Home AYUSH Health Facility sonography /ultrasound facility	No facility available			There is no Primary Health Center in village Various Schemes are available, but they have to approach to nearest village (1-5 kms away).
	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
K.	**Education Facilities:**				
	Aaganwadi/ Play group	Yes			Need to be Reconstruct.
	Primary School	upto 1-8 std.	Yes		
	Secondary school	No.			
	Higher sec. School	No.			
	ITI college/ vocational Training Center	No			
	Art, Commerce& Science /Polytechnic/ Engineering/ Medical/ Management/ other college facilities	No.			

	If any of the above Facility is not available in village than approx. distance from village: .....kms.				
Suggestions if any:					
L.	**Socio- Culture Facilities**	Condition	Location	Available (YES)	Available (NO)
	Community Hall (With or without TV)	Not Good w/o T.V.		Yes.	
1	Public Library (With daily newspaper supply: Y/N)			No	No
	Public Garden			No	No
	Village Pond				No
	Recreation Center				No
	Cinema/ Video Hall				No
	Assembly Polling Station				No (at Panchayat build.)
	Birth & Death Registration Office	Ba.panch office		Yes.	
If any of the above Facility is not available in village than approx. distance from village: .....kms.					
Suggestions if any:					
M.	**Other Facilities**	Condition	Location	Available (YES)	Available (NO)
	Post-office				No
	Telecommunication Network/ STD booth			Yes.	
	General Market				No
	Shops (Public Distribution System)				No
	Panchayat Building	Not Good		Yes	
	Pharmacy/Medical Shop				No
	Bank & ATM Facility				No.
	Agriculture Co-operative Society			Yes	
	Milk Co-operative Soc.	Not maintain		Yes	
	Small Scale Industries				No
	Internet Cafes/ Common Service Center/Wi Fi				No
	Youth Club				No.
	Mahila Mandal				No.

	Credit Cooperative Society Agricultural Cooperative Society Milk Cooperative Society Fishermen's Cooperative Society Computer Kiosk/ e-chaupal / Mills / Small Scale Industries			Yes Yes No No No	
	Other Facility				

Suggestions if any:

N.	Other Facilities	Condition		Available (YES)	Available (NO)
	1. Have these programme implemented the village? 2. Are there any beneficiaries in the village from the following programme? 3. Janani Suraksha Yojana 4. Kishori Shakti Yojana 5. Balika Samriddhi Yojana 6. Mid-day Meal Programme 7. Intergrated Child Development Scheme (ICDS) 8. Mahila Mandal Protsahan Yojana (MMPY) 9. National Food for work Programme (NFFWP) 10. National Social Assistance Programme 11. Sanitation Programme (SP) 12. Rajiv Gandhi National Drinking Water Mission 13. Swarnjayanti Gram Swarozgar Yojana 14. Minimum Needs Programme (MNP) 15. National Rural Employment Programme 16. Employee Guarantee Scheme (EGS) 17. Prime Minister Rojgar Yojana (PMRY) 18. Jawahar Rozgar Yojana (JRY) 19. Indira Awas Yaojna (IAY) 20. Samagra Awas Yojana (SAY) 21. Sanjay Gandhi Niradhar Yojana (SGNY) 22. Jawahar Gram Samridhi Yojana (JGSY) 23. Other (SPECIFY)				Such schemes / Yojanas are not available Some other Yojanas / Schemes are available.

VI. SUSTAINABLE /GREEN INFRASTRUCTURE FACILITIES:

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Adoption of Non-Conventional Energy Sources/ Renewable Energy Sources	No			There is no such facilities.
2.	Bio-Gas Plant Solar Street Lights Rain Water Harvesting System	No.	Only Solar street light is available (1-2)		
3.	Any Other	No.			

VII. DATA COLLECTION FROM VILLAGE

Sr. No.	Descriptions	Information/ Details	Adequate	Inadequate	Remarks
1.	Village Base Map Available: Hard Copy/Soft Copy	Yes (Soft Copy.)			
2.	Recent Projects going on for Development of Village	No			
3.	Any NGO working for village development	No			
4.	Any natural calamity in the village during the last one year: EARTHQUAKES FLOODS CYCLONE DROUGHT LANDSLIDES AVALANCHE OTHER (SPECIFY)	No.			Free from Calamities & disaster Prone areas.

VIII. ADDITIONAL INFORMATION/ REQUIREMENT:

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	Repair & Maintenance of Existing Public Infrastructure facilities,	Yes, needed.	
		NO	
	School Building	Yes, Good in condition.	
	Health Center	NO.	
	Panchayat Building	Yes, available	need to Renovation
	Public Toilets & any other	NO.	
2.	Additional Information/ Requirement	NO	
3.	During the last six months how many times CLEANING ..... FOGGING..... Drive was undertaken in the village?	NO.	

IX. Smart Village / Heritage Details

Sr. No.	Descriptions	Information/ Detail	Remarks
1.	IS THEIR ANY THING FOR THE VILLAGE ENHANCEMENT POSSIBLE ?		

Note: Photographs/ Video/ Drawings of all existing Infrastructure facilities & conditions should be taken by students of respective villages for their record and information.

For Any Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

કુંકણી ગ્રામ પંચાયત
સરપંચ શ્રી
ગ્રામ પંચાયત કુંકણી
તા. ઓલપાડ જિ. સુરત

12.4 Gap Analysis of the Allocated Village

VILLAGE GAP Analysis					
Village Facilities	**Planning Commission/UDPF I Norms**	**Village Name:**	KUNKNI		
		Population:		1000	
		Existing	**Required as per Norms**	**Smart Vilage / Cities / Future Projection Design**	**Gap**
Social Infrastructure Facilities					
Education					
Anganwadi	Each or Per 2500 population	1	2		1
Primary School	Each Per 2500 population	1	1		0
Secondary School	Per 7,500 population	0	0		0
Higher Secondary School	Per 15,000 Population	0	0		0
College	Per 125,000 Population	0	0		0
Tech. Training Institute	Per 100000 Population	0	0		0
Agriculture Research Centre	Per 100000 Population	1	0		1
Skill Development Center	Per 100000 Population	1	0		1
Health Facility					
Govt/Panchyat Dispensary or Sub PHC or Health Centre	Each Village	0	1		-1
Primary Health & Child Health Center	Per 20,000 population	0	1		-1
Child Welfare and Maternity Home	Per 10,000 population	0	0		0
Multispeciality Hospital	Per 100000 Population	0	0		0
Public Latrines	1 for 50 families (if toilet is not there in home, specially for slum pockets & kutcha house)	0	5		-5
Physical Infrastructure Facilities					
Transportation		**Adequate / Inadequate**			
Pucca Village Approach Road	Each village	Adequate	1		0
Bus/Auto Stand provision	All Villages connected	Adequate	0		0

	by PT (ST Bus or Auto)				
Drinking Water (Minimum 70 lpcd)		**Adequate / Inadequate**			
Over Head Tank	1/3 of Total Demand	Adequate	1		0
U/G Sump	2/3 of Total Demand	No			
Drainage Network - Open		**Adequate / Inadequate**			
Drainage Network - Cover		No			
Waste Management System		**Adequate / Inadequate**			
Socio- Cultural Infrastructure Facilities					
Community Hall	Per 10000 Population	1	1		0
Community hall and Public Library	Per 15000 Population	0	0		
Cremation Ground	Per 20,000 population	0	0		
Post Office	Per 10,000 population	0	1		
Gram Panchayat Building	Each individual/group panchayat	1	1		0
APMC	Per 100000 Population	0	0		
Fire Station	Per 100000 Population	0	0		
Public Garden	Per village	0	1		-1
Police post	Per 40,000Population	0	0		
Shopping Mall					
Electrical Design					
Electricity Network		**Adequate / Inadequate**			
		Adequate			
Any Smart Village Facility					
Technology					
		ESR cap	0		
		Sump cap	0		
		Lat	0		

12.5 Summary Details of All the Villages Designs in Table form Part-I

Sr. no	Village	Description	Design Proposal (Part-1)	Design Proposal (Part-2)
1	Rajgari	Civil	Sarvajanik Sauch Griha	Bus stand
			Public Dispensary	Chabutra
			Police Outpost	Pravesh Dwar
			Solar Field	Public distribution system shop
			Csc Centre	Swimming pool
			Rain Water Harvesting	Door to door waste collection system
		Electrical	Automatic Plant Watering System	Automatic light: DIM and DIP control
			Temperature Control System	Overspeed indication and accident prevention system
			Smoke Detector System	Wireless mobile charging using inductive coupling
2	Tenarang	Civil	Library	Pucca House
			Public latrine	Community Hall
			Clinic	Biogas Plant
			Lake Beautification	Gram Panchyat
			Bank	Police station
			Vertical Farming	Entrance Gate
		Electrical	Hybrid Street Light	Biogas Generator
			Solar Powered Charger	Footstep Power Generation
			Replacement of Light Source	Using piezo Electric Sensors
3	Kunkni	Civil	Low Cost Toilet	Reconstruction Of Panchayat Building

			Reconstruction Of Anganwadi	General Market
			Health Center	Reconstruction Of Milk Dairy
			Furrow Irrigation System	Bus Stand
			Rectangular Overhead Water Tank	Computer Classes With Cyber Café
			Biogas Plant	Agriculture Co-Operative Society
		Electrical	Smart Power Theft Detection System	Automated Solar Grass Cutter
			Short Circuit Protection	Smart Street Light
			Vertical Axis Wind Turbine	LPG Leakage Detector
4	Narthan	Civil	Public Latrine Block	Agro Storage Unit
			Public Health Centre	Drinking Water Facility
			Community Hall	WBM Road
			Rain Water Harvesting with Ground Water Recharge	Overhead Water Tank
			General Market	Vermicomposting Unit
			Entrance Gate	Maintenance of Bus Stand
		Electrical	Auto Electronic School Bell	Generate power using micro turbine
			Automated Night Lighting System	Simple low power inverter
			Solar Powered Battery Charging With Reverse Current Protection	Remote operated home appliances control

12.6 Drawings (If, required, A1, A2, A3 design is not visible then only)

All the drawings are clearly visible and provided above in the design.

12.7 Summary of Good Photographs in Table Format

TABLE 23 -SUMMARY OF GOOD PHOTOGRAPHS	
	
Temple	**Gram panchayat building**
	
Community hall	**Milk dairy**
	
Play Ground	**Street light**

	
Water tank	**School**
	
Agricultural fields	**Housing Condition**
	
In Panchyat Building	**In Another Area**

	
Farm	**School Classroom**
	
Canal	**Lake**
	
With sarpanch	**In village at temple**

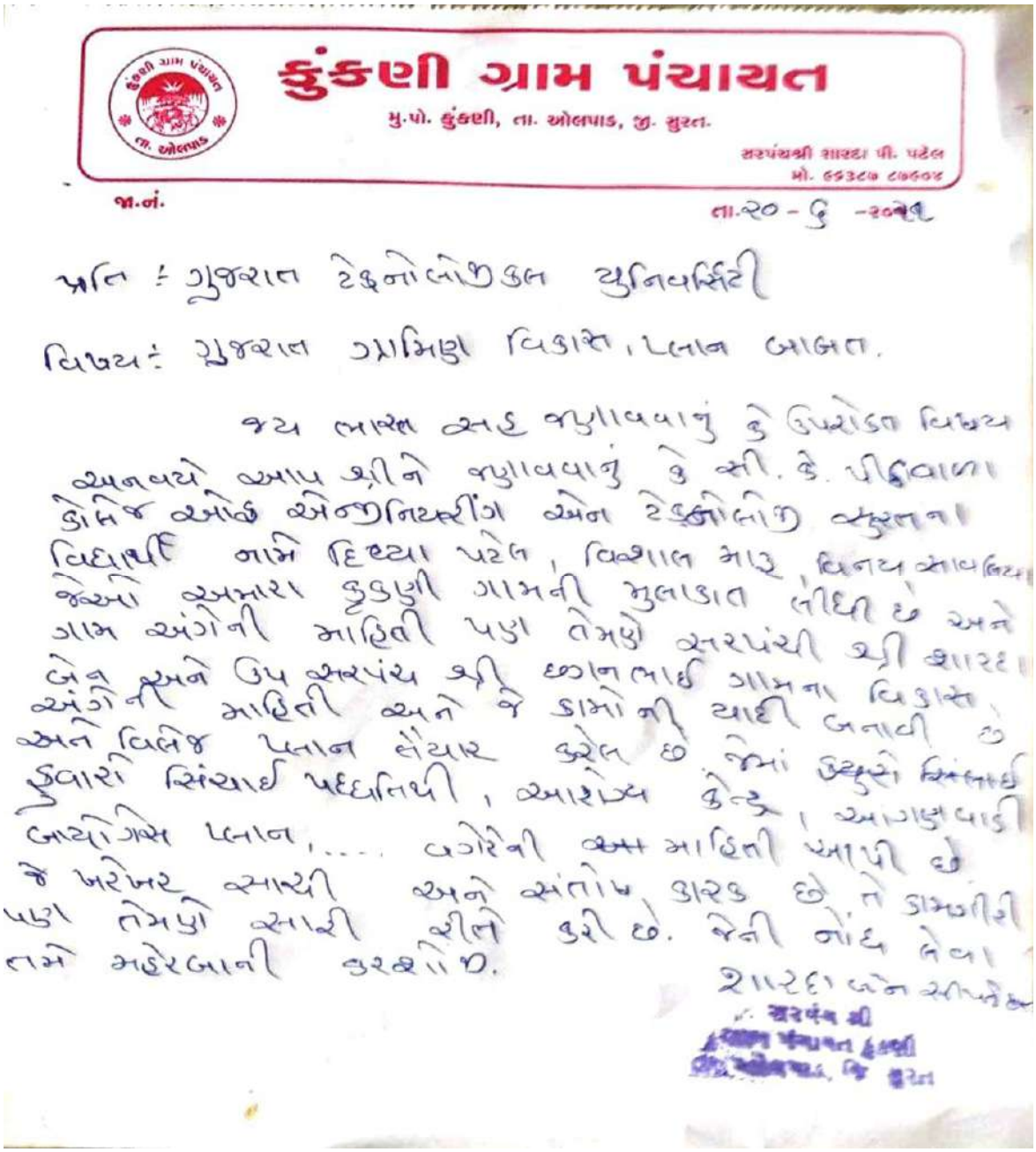
12.8 Village Interaction with Sarpanch Report with the Photograph

VILLAGE INTERACTION REPORT

21 October 2020: Kunkni - Olpad: The assigned village several times and communicated with the different users of the village. 1st we tried to interact with Sarpanch (Sardaben Patel), with the aid of her and constructive cooperation, we collected the data related to the different schemes and yojana introduced in the village and their current conditions. Conditions of transport and various grants and their values used for building and maintenance purposes. Irrigation facilities exist in the village, whether sufficient or not, and all other modes, such as tube well. Educational services, health centres, socio-cultural infrastructures. We have interactions with villagers for more comprehensive data collection of land use trends and their respective areas. We also interacted with various villagers, farmers, in order to know the real state of the village and the problems faced by them and their desire to have different facilities.

Reported by
Divya Patel
Vishal Maru
Vinay Savaliya

12.9 Sarpanch Letter giving information about the village development



કુંકણી ગ્રામ પંચાયત

મુ.પો. કુંકણી, તા. ઓલપાડ, જી. સુરત.

સરપંચશ્રી શારદા પી. પટેલ

મો. ૬૨૩૮૭ ૮૭૬૦૪

જા.નં.

તા.૨૦-૬-૨૦૧૯

પ્રતિ : ગુજરાત ટેકનોલોજીકલ યુનિવર્સિટી

વિષય : ગુજરાત ગ્રામિણ વિકાસ પ્લાન બાબત.

જય ભારત સહ જણાવવાનું કે ઉપરોક્ત વિષય અનવયે આપ શ્રીને જણાવવાનું કે સી. કે. પીઠાવાળા કોલેજ ઓફ એન્જીનિયરીંગ એન્ડ ટેકનોલોજી સુરતના વિદ્યાર્થી નામે દિવ્યા પટેલ, વિશાલ માડુ, વિનય ચાવલિયા જેઓ અમારા કુંકણી ગામની મુલાકાત લીધી છે અને ગામ અંગેની માહિતી પણ તેમણે સરપંચ શ્રી શારદા બેન અને ઉપ સરપંચ શ્રી જ્ઞાનભાઈ ગામના વિકાસ અંગેની માહિતી અને જે કામો ની યાદી બનાવી છે અને વિલેજ પ્લાન તૈયાર કરેલ છે જેમાં ઉદ્યોગો સિંચાઈ પદ્ધતિથી, આરોગ્ય કેન્દ્ર, આંગણવાડી જરૂરીયાત પ્લાન,.... વગેરેની આ માહિતી આપી છે જે બરોબર સારી અને સંતોષ કારક છે તે ગામજનો પણ તેમનો સારો સહકાર આપી રહ્યા છે. જેની નોંધ લેવા તમે મહેરબાની કરશો.

શારદા બેન પટેલ

સરપંચ શ્રી

કુંકણી ગ્રામ પંચાયત કુંકણી

તા. ઓલપાડ, જિ. સુરત

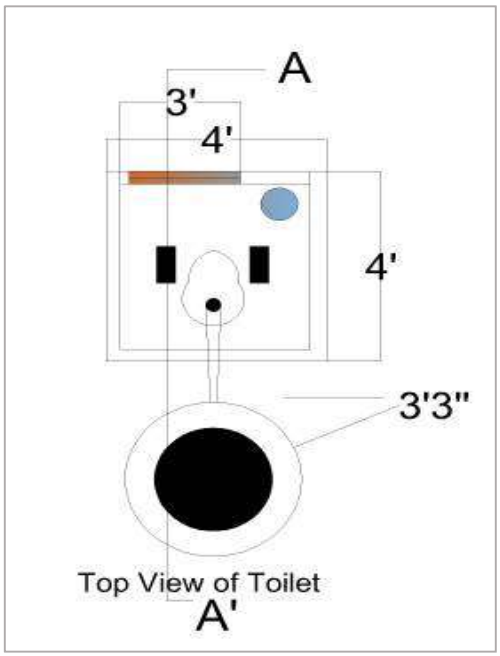
12.10 Comprehensive report preparation as per format

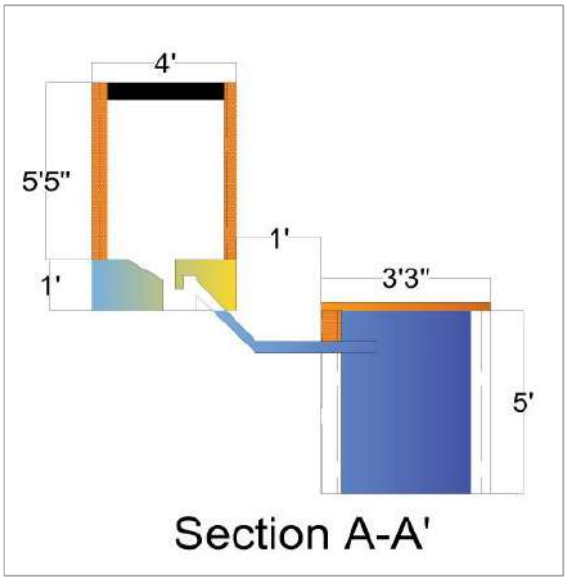
CONCEPT

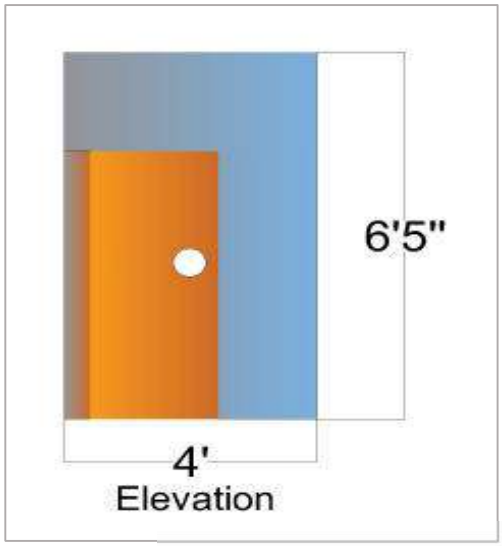
Vishwakarma Yojana is provides special scheme for development of village by GTU and Government of Gujarat in which students work together and collect data and information regards village development with the help of gram panchayat and stake holders. Village have some basic facilities likes drinking water, drainage system, pucca road, and other facilities like primary school, community hall, are sufficient so that village can develop. So, we will give proposal regarding sustainable energy sources and solution related to infrastructure problems. Efforts have been made in this project work to identify and plan some of the below facilities for sustainable development of village and to meet need of future population. Vishwakarma Yojana is one of the initiatives towards Rurbanization that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU.

It is one of the strategies to reduce urban city pressure and lower the migration rate by developing village with a “rural soul” but with all urban amenities that a city may have. In this project the students meet the relevant citizens of village and survey the existing facilities. Then design of the sustainable infrastructure which is to be modified is carried out for the village. This includes implementation of engineering skills to prepare detailed project reports for village as a part of the final year project work. By this project certain experiences recreates a real work and need of application of an individual technical knowledge on any existing problems. Based on survey we tried to give design of basic facilities to fulfill their needs. By providing these basic facilities to village for reduce urban city pressure and decrease migration rate, which is ultimate aim of Vishwakarma Yojana.

Village: Kunkni District: Surat

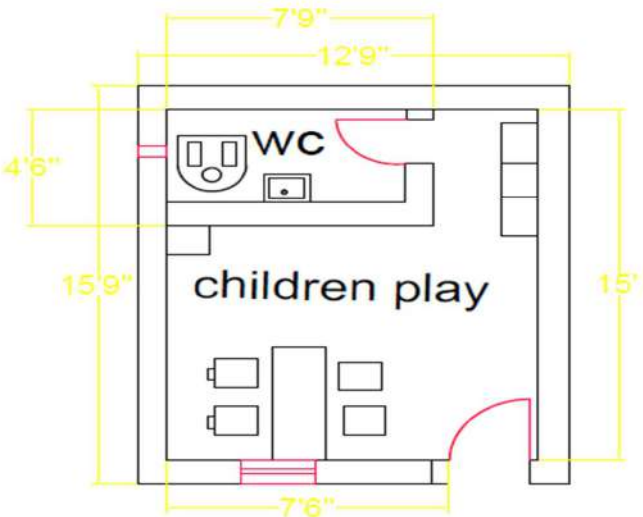




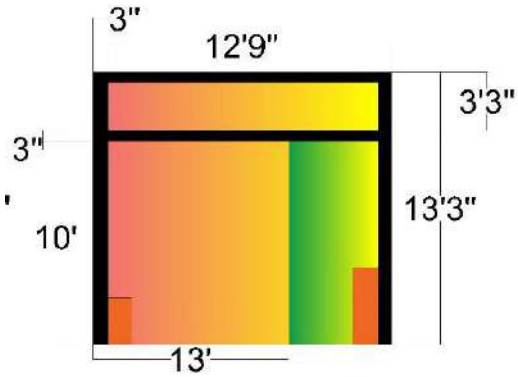


Design Infrastructure - Low Cost Toilet
Village – Kunkni, Olpad, Surat

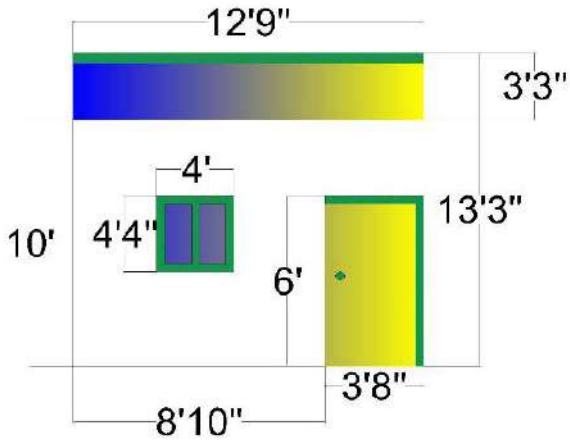
Village: Kunkni District: Surat



Design of Anganwadi



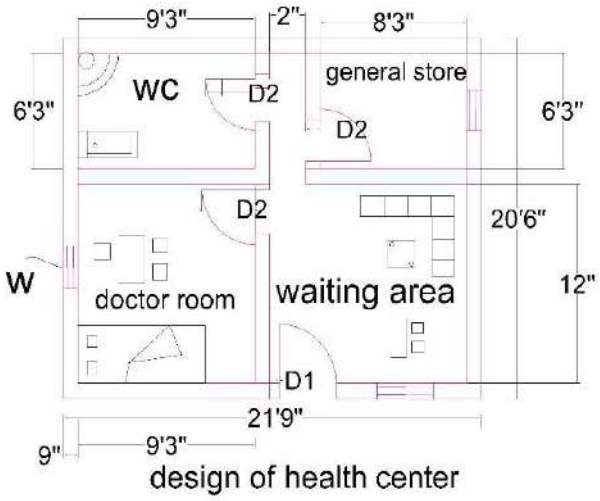
Section A-A'



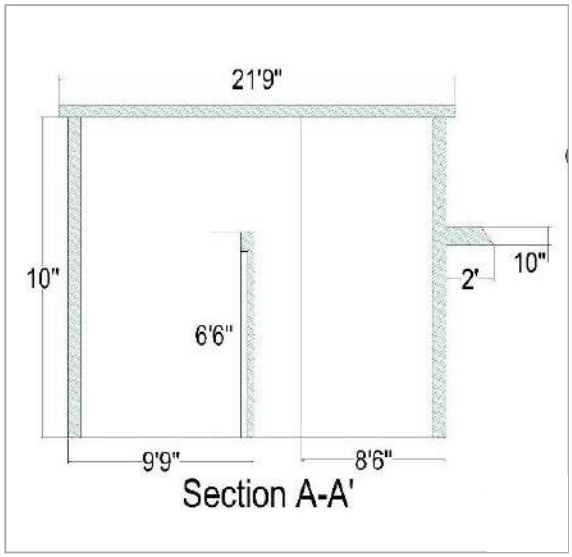
Front Elevation

Design Infrastructure - Reconstruction of Anganwadi
Village – Kunkni, Olpad, Surat

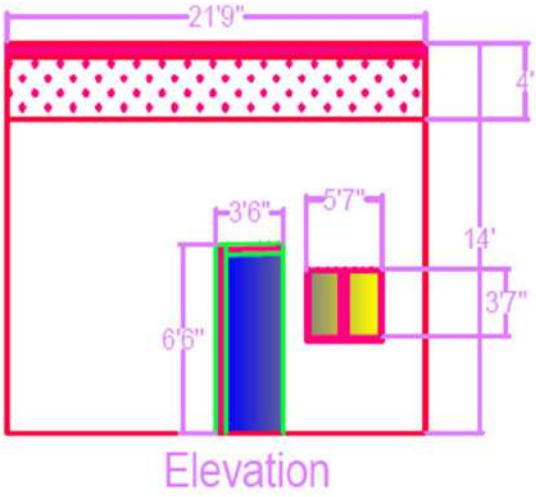
Village: Kunkni District: Surat



design of health center



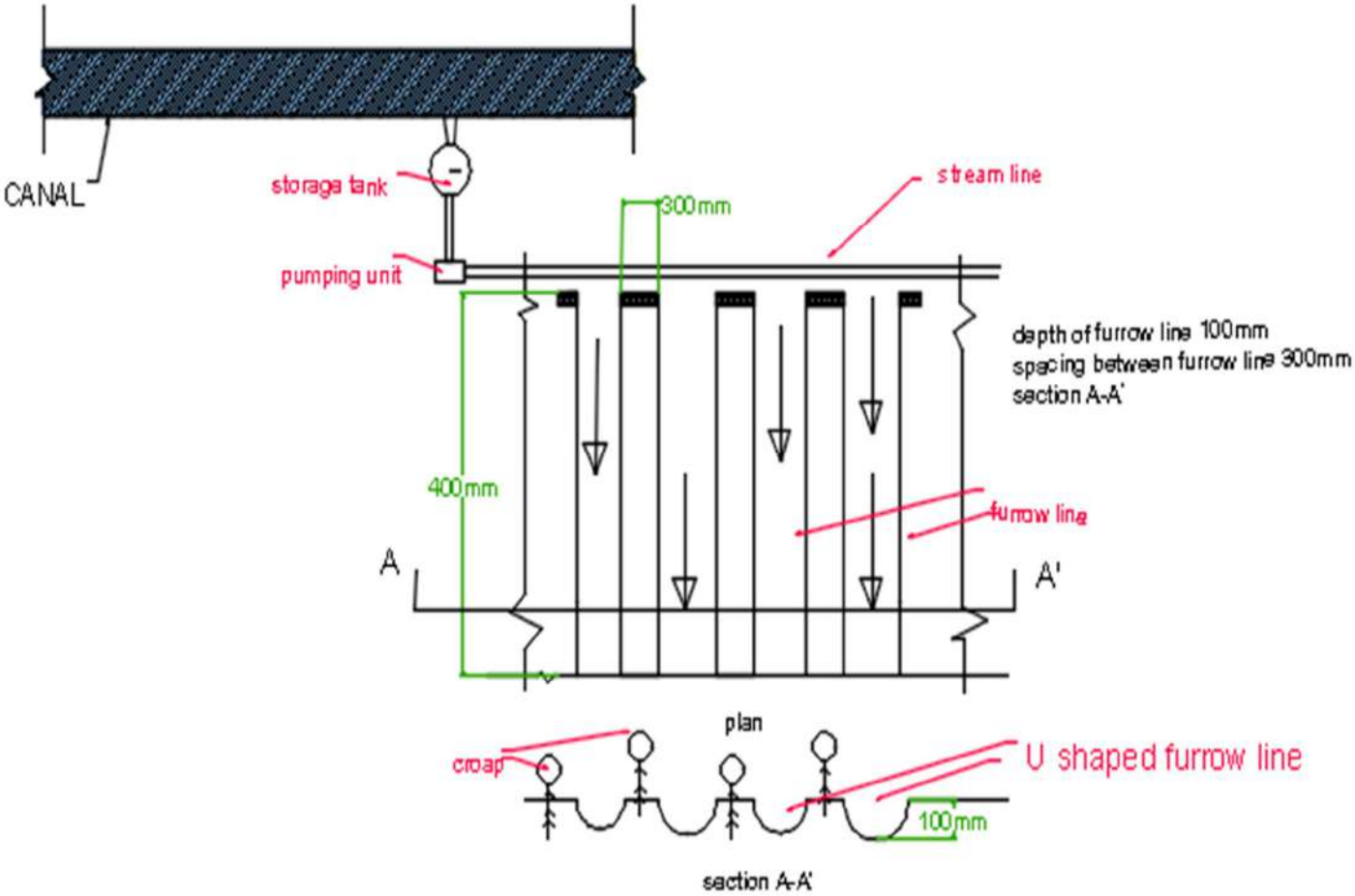
Section A-A'



Elevation

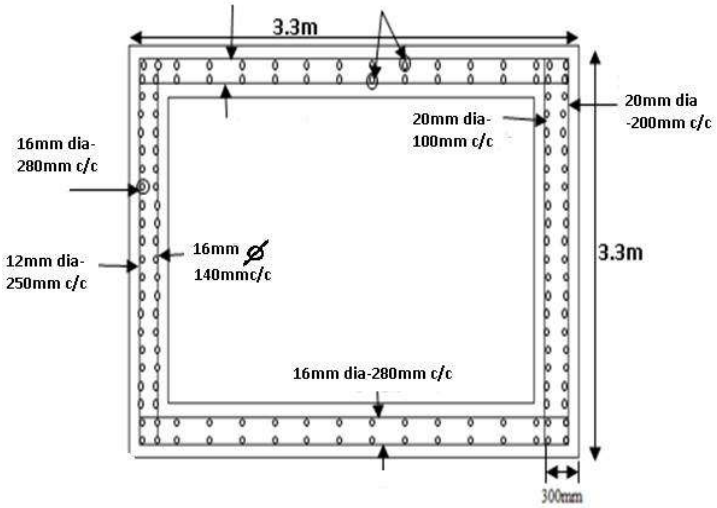
Design Infrastructure – Health Center
Village – Kunkni, Olpad, Surat

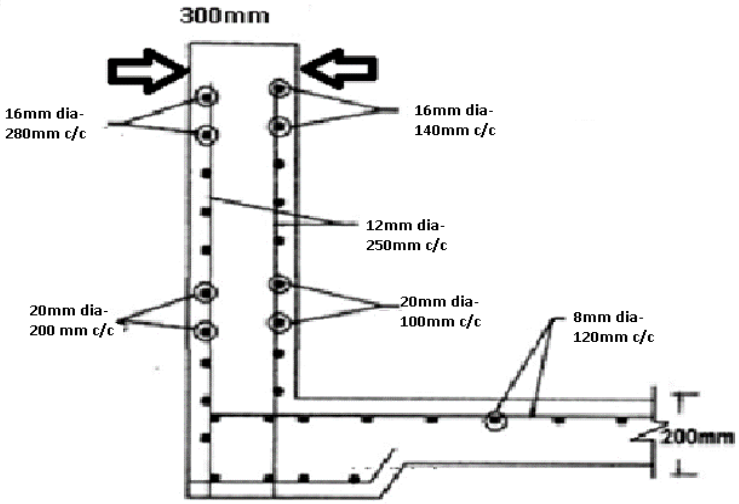
Village: Kunkni District: Surat

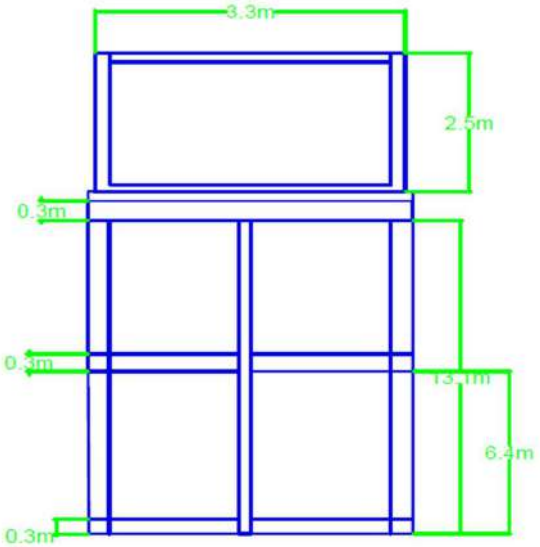


Design Infrastructure – Furrow Irrigation
Village – Kunkni, Olpad, Surat

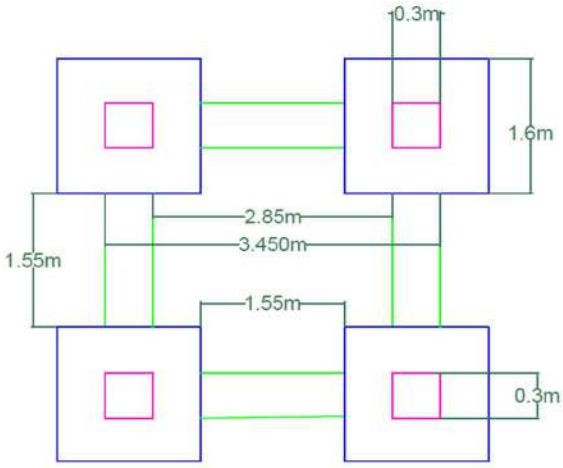
Village: Kunkni District: Surat







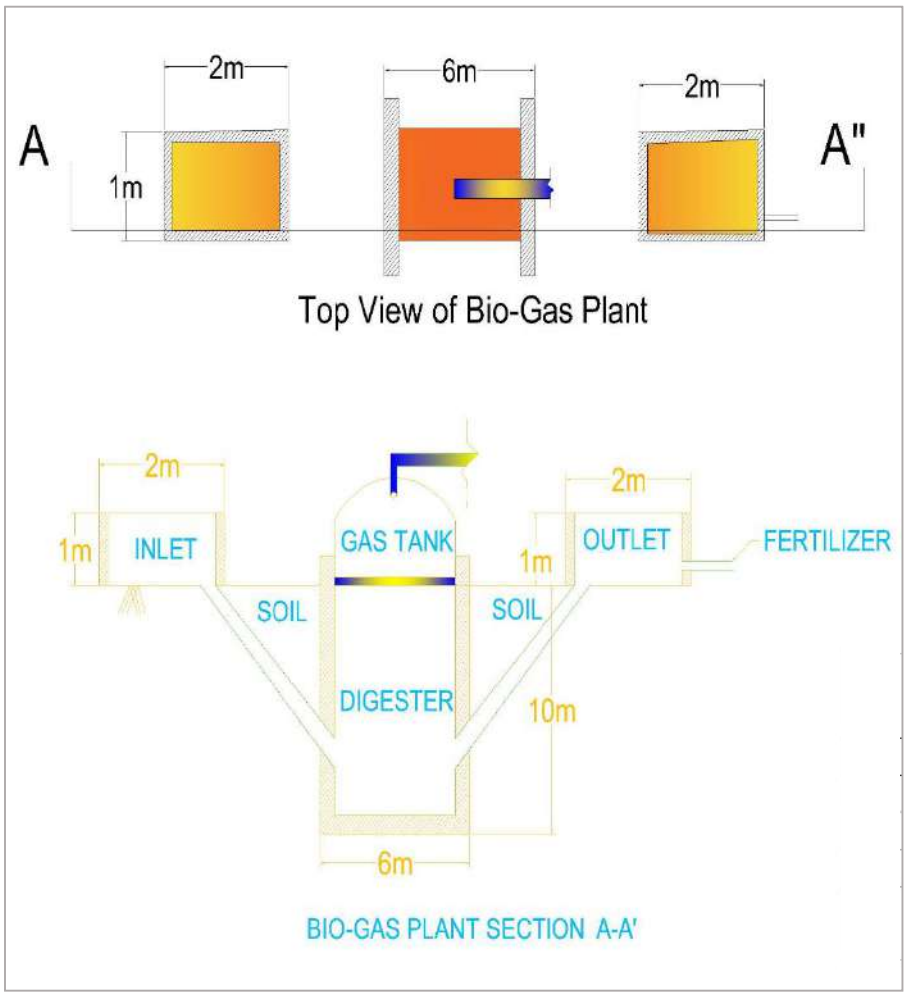
Elevation of Elevated water tank

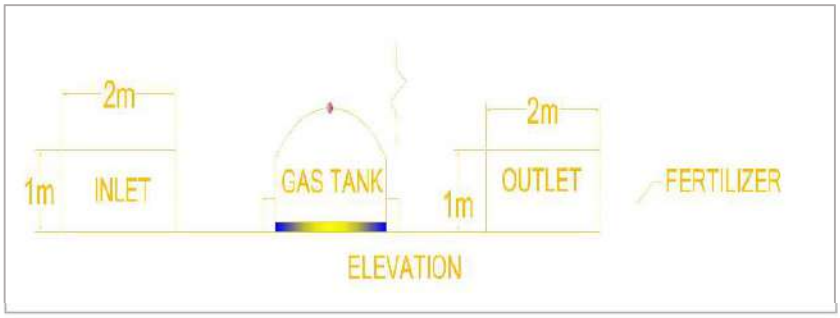


Foundation of water tank

Design Infrastructure – Rectangular Overhead Water Tank
Village – Kunkni, Olpad, Surat

Village: Kunkni District: Surat





Design Infrastructure – Biogas Plant
Village – Kunkni, Olpad, Surat

NODAL OFFICER STATEMENT:

By providing this required facility to village, development and growth of village can be possible. So ultimately migration rate and urban city pressure can be reduced and livelihood of village dweller will increase

All the design which is given as above are very helpful for future development of village and village people for their enhancement and prosperity. I admire these students to do work related to civil & electrical engineering people and hope these works is help to improve and understand their skills and make it even better. I am sure they got deep knowledge about development of village and various infrastructure facility design of village. Lastly, we all enjoyed the informational as well as practical journey of civil engineering work.

Nodal Officer

Dr. Boski P. Chauhan
Civil Department
C.K. Pithawala College of Engineering and Technology.

Prof. Hetal H. Jivanramjiwala
Electrical Department
C.K. Pithawala College of Engineering and Technology.

PART-II

Chapter 13. From the Chapter- 9 future designs of the aspects (Feasibility, Construction, Operation and maintenance of various design options in Rural Areas along with cost with AutoCAD designs / planning with any software)

13.1 Sustainable Design Proposals

Table – 24 Designing Planning Proposal

Sr. No.	Village	Field	Design
1	Kunkni	Civil	Reconstruction Of Panchayat Building
2	Kunkni	Civil	General Market
3	Kunkni	Civil	Reconstruction Of The Milk Dairy
4	Kunkni	Civil	Bus Stand
5	Kunkni	Civil	Computer Classes With Cyber Café
6	Kunkni	Civil	Agriculture Co-Operative Society
7	Kunkni	Electrical	Automated Solar Gas Cutter
8	Kunkni	Electrical	Smart Street Light
9	Kunkni	Electrical	LPG Leakage Detector

13.1.1 RECONSTRUCTION OF THE PANCHAYAT BUILDING

The existing condition of the panchayat house is not well maintain and has developed cracks, window & door are also broken. So reconstruction of it is proposed and it is design on the same place with somewhat little bit increment in the dimension instead of actual so that it has proper space. Store room is provided so that the data is store and keep safe. Drawing is made using AutoCAD software. It is reconstructed under the government scheme.

Fig. – 73 Existing Panchayat Building

Estimation Sheet of Panchayat Building

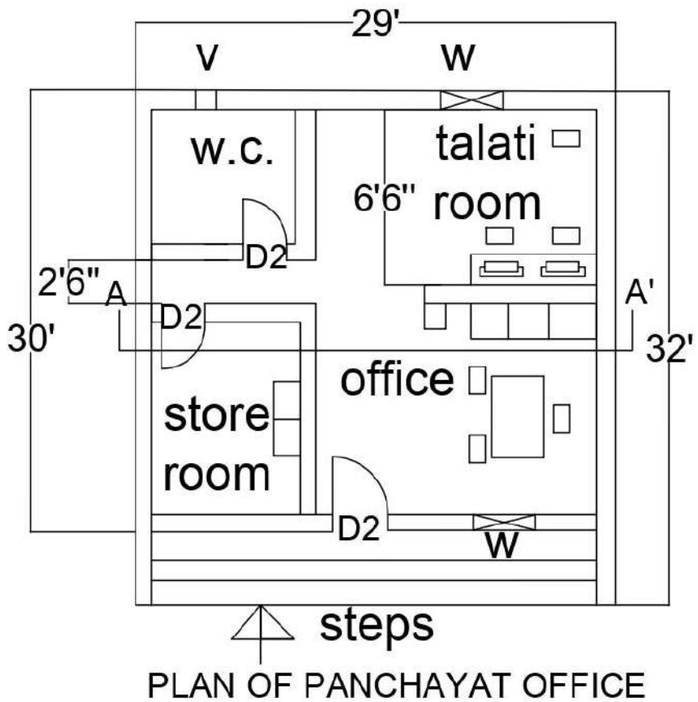
Table – 25 Estimation Sheet Of Panchayat Building							
Sr. No.	**Description of Item**	**No.**	**L (m)**	**B (m)**	**H (m)**	**Quantity (m^3)**	**Total Qty. (m^3)**
1	Earthwork in excavation for Foundation						
	Net C.L. length = 44.59 – (0.5*0.90*8) = 40.99m	1	40.99	0.90	0.90	33.20	
						Total =	33.20
2	P.C.C.	1	40.99	0.90	0.20	7.37	
						Total =	7.37
3	Brick masonry up to plinth in C.M. (1:6)						
	First step	1	42.99	0.4	0.2	3.439	
	Second step	1	43.39	0.3	0.2	2.639	
	Third step	1	43.79	0.2	0.75	6.568	
						Total =	12.64
	Stair case : First step	1	8.38	0.9	0.15	1.13	
	Second step	1	8.38	0.6	0.15	0.75	
	Third step	1	8.38	0.3	0.15	0.37	
						Total =	2.26
						Net =	14.9
4	Brick masonry above plinth level						
	Length = 44.59-(0.1*8) = 43.79	4	43.79	0.2	3	105.09	
						Total =	105.09
5	Deduction for walls						
	Door - D1	1	1.1	0.2	2.1	0.462	
	D2	2	0.9	0.2	2.1	0.756	
	Window	2	1.6	0.2	1.83	1.171	
	Ventilation	1	0.61	0.2	0.61	0.074	
						Total =	2.463
6	Deduction for lintel						
		1	1.4	0.2	0.15	0.042	
		2	1.2	0.2	0.15	0.072	
		2	1.9	0.2	0.15	0.114	
						Total =	0.228
						Net quantity =	102.400
7	Plaster inside the room C.M.(1:3)						

	Main room	2	6.09		3	36.54	
		2	7.05		3	42.3	
	Store room	2	1.52		3	9.12	
		2	5.98		3	35.88	
	Talati room	2	1.98		3	11.88	
		2	7.05		3	42.3	
	W.C.	2	1.52		3	18.24	
	Front of w.c. and store room	2	1.52		3	9.12	
						Total =	205.38
9	Plaster for ceiling						
	Main room	1	7.05	6.09		42.93	
	Store room	1	1.52	5.98		9.08	
	Talati room	1	7.05	1.98		13.95	
	W.C. area	1	1.52	1.52		2.31	
	In front of w.c. and store room	1	1.52	0.76		1.15	
						Total =	69.42
10	Deduction of plaster for door and window						
	D1	1/2	1.1		2.1	1.15	
	D2	4/2	0.9		2.1	3.78	
	Window	2/2	1.6		1.83	2.93	
						Total =	7.86
						Net quantity	266.94

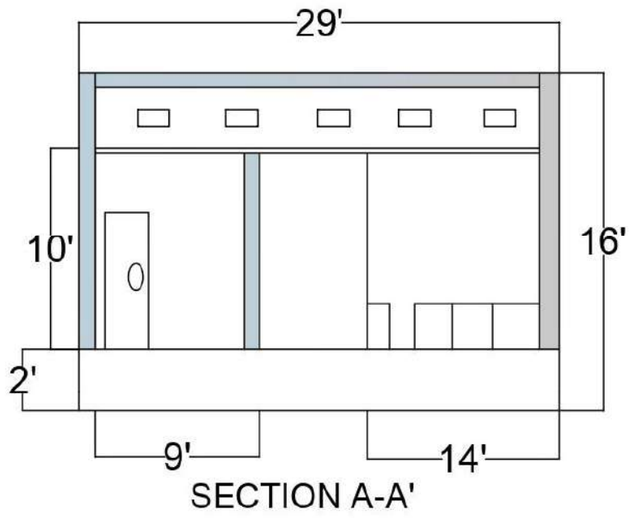
Abstract Sheet of Panchayat Building

Table – 26 Abstract Sheet of Panchayat Building

Sr. No.	Description of Item	Quantity	Rate	Per Unit	Total Cost (Rs.)
1	Excavation in foundation	33.20	90	m^3	2988
2	P. C. C. (1:4:8)	7.37	3200	m^3	23584
3	Brick masonry in foundation and upto plinth C.M.(1:6)	14.9	3700	m^3	55130
5	Bricks masonry in superstructure	102.400	4000	m^3	409600
6	Plaster	266.94	200	m^2	53388
7	White wash	266.94	15	m^2	4004.1
				Total cost	548694.1
		Add 1.5% Water Charge			8230.41
		Add 10% Contractor Profit			54869.41
		Total Estimation cost in Rs.			6,11,793.92



PLAN OF PANCHAYAT OFFICE

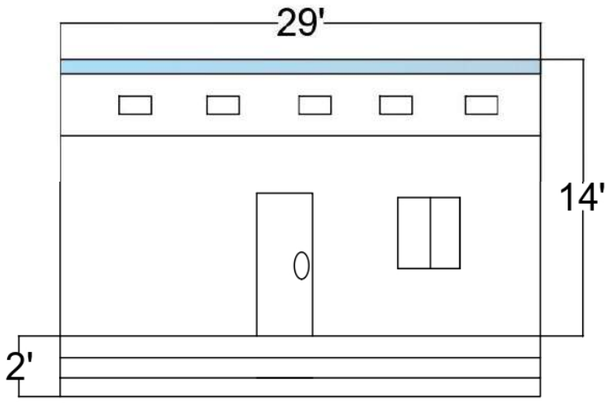


SECTION A-A'

OFFICE 15'X21'3"
STAFF ROOM 14'X6'6"
STORE ROOM 9'X21'
WINDOW 4'X4'
DOOR D1 4'X7'
DOOR D2 3'6"X6'
W.C. 9'X3'6"
WALL 9"

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.(ALL DIMENSION IN FEET)
2) PAMCHAYAT OFFICE SHOULD BE CENTER IN VILLAGE
3) IT EXECUTE GOVERNMENT SCHEMES (EMPLOYMENT)



ELEVATION

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	PANCHAYAT OFFICE
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Fig. – 74 Plan, Section, Elevation of Reconstruction of Panchayat Building

13.1.2 GENERAL MARKET

The market is design because there is no PDS store, stationary, medical shop in the village, they have to travel far or to the towns for this basic needs. The plan consist of 3 stalls and one security cabin and one W.C. so that the villagers can have facilities within village in emergency and not to spend money for travelling. The design made using AutoCAD software.

Estimation Sheet of General Market

Table – 27 Estimation Sheet Of General Market

Sr. No.	Description of Item	No.	L (m)	B (m)	H (m)	Quantity (m^3)	Total Qty. (m^3)
1	Earthwork in excavation for Foundation						
	1. Long wall – main	3	9.17	0.7	0.7	13.47	
	2. Stall 3	1	3.98	0.7	0.7	1.95	
	3. Security cabin	1	1.05	0.7	0.7	0.51	15.93
	Short wall - Type 1	2	8.52	0.7	0.7	8.34	
	1. Stall 2, 1	2	3.53	0.7	0.7	3.45	
	Type 2	2	1.97	0.7	0.7	1.93	
	Type 3	1	2.58	0.7	0.7	1.26	14.98
						Total =	30.91
2	P.C.C.						
	1. Long 1	3	9.17	0.7	0.30	5.77	
	2. Long wall 2	1	1.05	0.7	0.3	0.22	
	3. Short wall – Type1	2	8.52	0.7	0.30	3.57	
	Type 2	1	1.97	0.7	0.30	0.41	
	Type 3	1	2.58	0.7	0.30	0.54	
	Type 4	1	3.98	0.7	0.3	0.83	
						Total =	11.34
3	Brick masonry up to plinth in C.M. (1:6)						
	Long wall						
	First step	3	8.97	0.5	0.2	2.69	
	Second step	3	8.87	0.4	0.2	2.12	
	Third step	3	8.7	0.23	0.45	2.70	7.51
	1. Stall 3						
	First step	1	3.78	0.5	0.2	0.37	
	Second step	1	3.68	0.4	0.2	0.29	
	Third step	1	3.51	0.23	0.45	0.36	1.02
	2. S.C.						

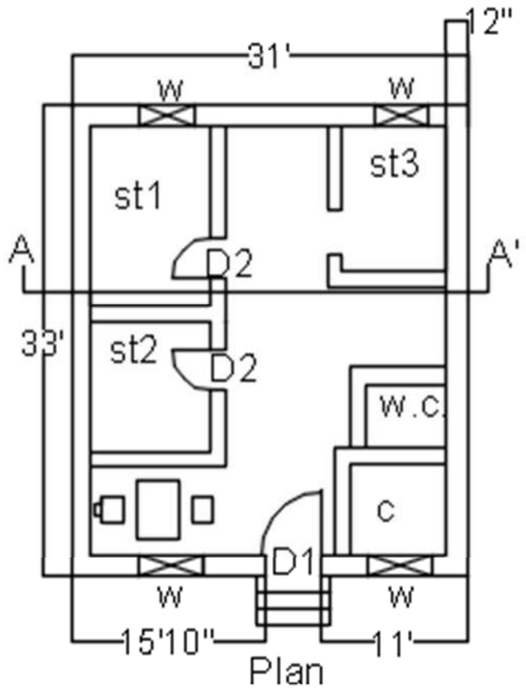
	First step	1	0.85	0.5	0.2	0.08	
	Second step	1	0.75	0.4	0.2	0.06	
	Third step	1	0.58	0.23	0.45	0.06	0.2
	Short wall						
	Type 1 First step	2	8.72	0.5	0.2	1.74	
	Second step	2	8.82	0.4	0.2	1.41	
	Third step	2	8.99	0.23	0.45	1.86	5.01
	Type 2 First step	2	3.73	0.5	0.2	0.74	
	Second step	2	3.83	0.4	0.2	0.61	
	Third step	2	4	0.23	0.45	0.82	2.17
	Type 3 First step	1	2.78	0.5	0.2	0.27	
	Second step	1	2.88	0.4	0.2	0.23	
	Third step	1	3.05	0.23	0.45	0.31	0.81
	Type 4 First step	2	2.17	0.5	0.2	0.43	
	Second step	2	2.27	0.4	0.2	0.36	
	Third step	2	2.44	0.23	0.45	0.50	1.29
						Total =	18.01
4	Damp proof course (1:2:4)						
	Long wall 1. Main	3	8.7		0.05	1.30	
	2. Stall 3	1	3.51		0.05	0.17	
	3. S.C.	1	0.58		0.05	0.03	1.5
	Short wall Type 1	2	8.99		0.05	0.89	
	Type 2	2	4		0.05	0.4	
	Type 3	1	3.05		0.05	0.15	
	Type 4	2	2.44		0.05	0.24	1.68
	Stair case : First step	1	1.10	0.9	0.05	0.05	
	Second step	1	1.10	0.6	0.05	0.03	
	Third step	1	1.10	0.3	0.05	0.02	0.1
						Total =	3.28
5	Brick masonry above plinth level						
	Long wall 1. Main	3	8.7	0.23	3	18.00	
	2. Stall 3	1	3.51	0.23	3	2.42	

	3. S.C.	1	0.58	0.23	3	0.40	20.82
	Short wall Type 1	2	8.99	0.23	3	12.40	
	Type 2	2	4	0.23	3	5.52	
	Type 3	1	3.05	0.23	3	2.10	
	Type 4	2	2.44	0.23	3	3.36	23.38
						Total =	44.2
	Deduction for door window						
	D1	1	1.10	0.23	2.10	0.53	
	D2	5	0.9	0.23	2.10	2.17	
	W	4	1.80	0.23	1.40	2.31	
	V	1	0.61	0.23	0.61	0.08	-5.09
	Deduction for lintel						
	D1	1	1.4	0.23	0.15	0.04	
	D2	5	1.2	0.23	0.15	0.20	
	W	4	2.1	0.23	0.15	0.28	
	V	1	0.91	0.23	0.15	0.03	-0.55
						Total =	38.56
6	Plaster inside the room C.M.(1:3)						
	Stall 1, 2	4	3.89		3	46.68	
		4	4		3	48	
	Stall 3	2	3.05		3	18.3	
		2	3.05		3	18.3	
	S.C.	2	2.44		3	14.64	
		2	1.52		3	9.12	
	W.C.	2	1.83		3	10.98	
		2	1.52		3	9.12	
	Open area	1	3.05		3	9.15	
		1	1.83		3	5.49	
	Inquiry room	1	5.11		3	15.33	
		1	1.14		3	3.42	
	Passage	2	16.58		3	99.48	
						Total =	308.01
	Deduction for door window						
	D1	1/2	1.10		2.10	1.15	
	D2	10/2	0.9		2.10	9.45	
	W	4/2	1.80		1.40	5.04	-15.64
						Total =	292.37

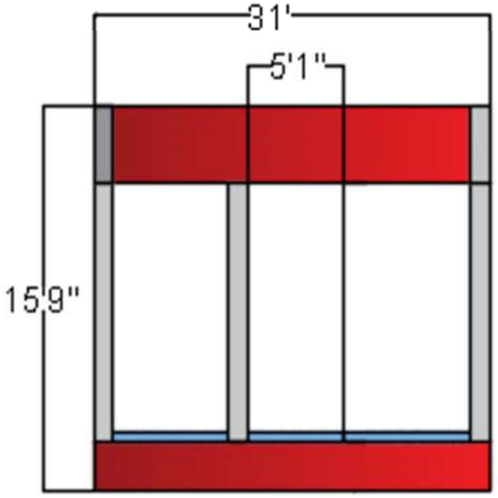
7	R.C.C. work for slab (1:2:4), stall 1,2,3, W.C., S.C., O.A., inquiry room	1	10.06	9.45	0.10	9.50	

Abstract Sheet of General Market

Table – 28 Abstract Sheet of General Market					
Sr. No.	**Description of Item**	**Quantity**	**Rate**	**Per Unit**	**Total Cost (Rs.)**
1	Excavation in foundation	30.91	90	m^3	2781.9
2	P. C. C. (1:4:8)	11.34	3200	m^3	36288
3	Brick masonry in foundation and up to plinth C.M.(1:6)	18.01	3700	m^3	66637
4	D.P.C. (1:2:4)	3.28	200	m^3	656
5	Bricks masonry in superstructure	38.56	4000	m^3	154240
6	Plaster	292.37	200	m^2	58474
7	R.C.C. work for slab (1:2:4), stall 1,2,3, W.C., S.C., O.A., inquiry room	9.50	9000	m^2	85500
				Total cost Rs. =	404576.9
		Add 1.5% Water Charge			6068.65
		Add 10% Contractor Profit			40457.69
		Total Estimation cost in Rs.			4,51,103



Plan

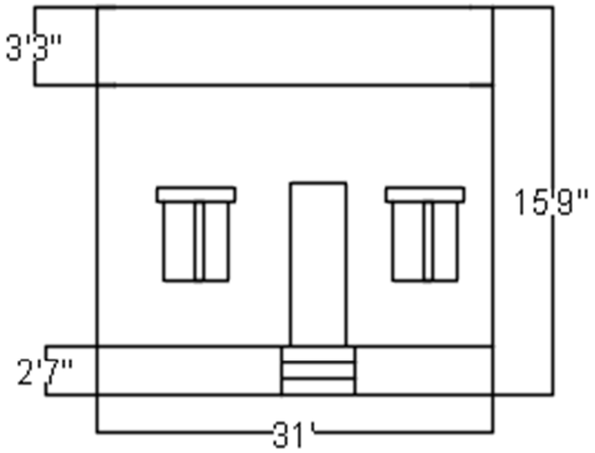


Section A-A'

store1 =12'8"x13'1"
store2 =12'8"x13'1"
store3 =10'x10'
passage =5'1"
cabin(c) =4'9"X4'9"
D1 door =5'2"x6'6"
D2 door =3'x6'6"
window =5'8"x4'5"

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.(ALL DIMENSION IN FEET)
2)USE M-20 GRADE CONCRETE
3)IT SHOULD GOOD STRUCTURE & FACILITY
4)IT SHOULD HAVE ENOUGH SPACE



Elevation

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	GENERAL STORE
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Fig. - 75 Plan, Section, Elevation of General Market

13.1.3 RECONSTRUCTION OF THE MILK DAIRY

The dairy is previously used by them for collection of milk, but nowadays it is not used as it need to maintain and well design structure. So reconstruction of it is to be done. We have provide a cabin where the main man can handle it and have data, lab in where the milk quality is tested, and the open space is for the collection of milk that villagers give it and from here it is supply to the towns or to the dairy industry. Design in AutoCAD software.

Estimation Sheet of Dairy Building

Table – 29 Estimation Sheet Of Dairy Building

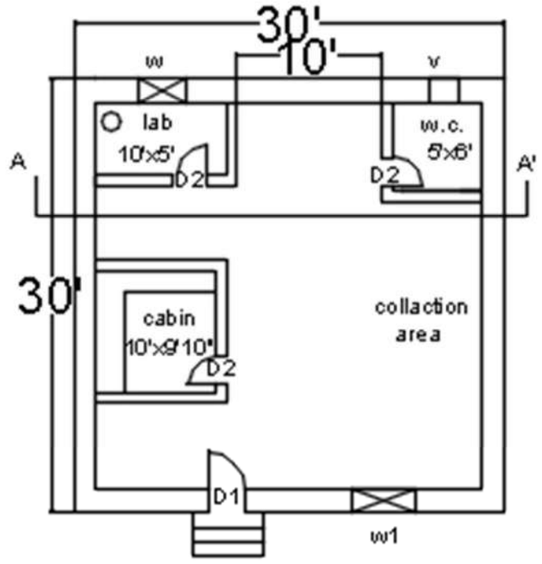
Sr. No.	Description of Item	No.	L (m)	B (m)	H (m)	Quantity (m^3)	Total Qty. (m^3)
1	Earthwork excavation for Foundation						
	Net C.L. length = 51.43-(0.5*0.9*6) = 48.73	1	48.73	0.90	1.4	61.40	
						Total =	61.40
2	Brick Bat Cement Conncrete (1:4:8) in foundation	1	48.73	0.90	0.20	8.77	
						Total =	8.77
3	Brick masonry up to plinth in C.M. (1:6)						
	First step	1	50.23	0.4	0.3	6.02	
	Second step	1	50.53	0.3	0.3	4.54	
	Third step	1	50.83	0.2	1.05	10.70	
						Total =	21.26
	Stair case : First step	1	1.10	0.9	0.15	0.15	
	Second step	1	1.10	0.6	0.15	0.1	
	Third step	1	1.10	0.3	0.15	0.05	
							0.3
						Total =	21.56
4	Brick masonry above plinth level						
		1	50.83	0.2	3	30.49	
						Total =	30.49
	Deduction for walls						
	Door - D	4	1.1	0.2	2.10	1.84	
	Window	2	1.61	0.2	1.40	0.90	
	Ventilation	1	0.61	0.2	0.61	0.07	
						Total =	2.81
	Deduction for lintel						
		4	1.4	0.2	0.15	0.17	
		2	1.91	0.2	0.15	0.11	

						Total =	0.28
						Net quantity =	27.4
5	Plaster inside the room C.M.(1:3)						
	Lab	2	1.52		3	9.12	
		2	3.05		3	18.3	
	Cabin	2	3.05		3	18.3	
		2	3.05		3	18.3	
	W.C.	2	1.83		3	10..98	
		2	1.52		3	9.12	
	Passage	2	8.74		3	52.44	
		2	7.02		3	42.12	
						Total =	178.68
	Deduction of plaster for door and window						
	D	7/2	1.10		2.1	1.15	
	Window	2/2	1.61		1.40	2.25	
						Total =	3.40
						Net quantity =	175.28
6	Brickwork for parapet wall L = 35.76	1	35.76	0.2	1.0	7.15	= 3576 ~ 4000 nos. of brick required

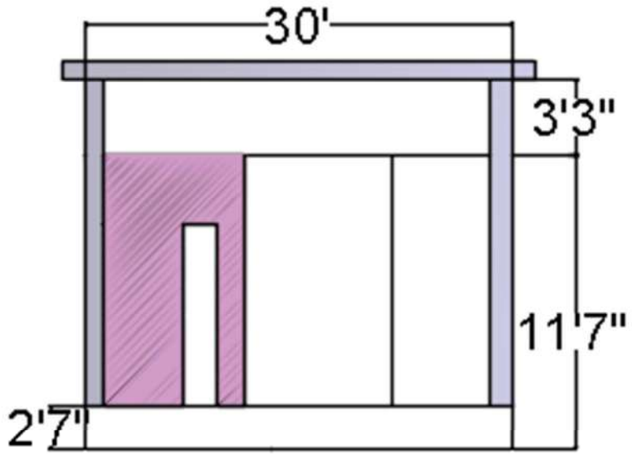
Abstract Sheet of Dairy Building

Table – 30 Abstract Sheet of Dairy Building

Sr. No.	Description of Item	Quantity	Rate	Per Unit	Total Cost (Rs.)
1	Excavation in foundation	61.40	90	m^3	5526
2	B.B.C.C. (1:4:8)	8.77	3200	m^3	28064
3	Brick masonry in foundation and up to plinth C.M.(1:6)	21.26	3700	m^3	78662
5	Bricks masonry in superstructure	27.4	4000	m^3	109600
6	Plaster	175.28	200	m^2	35056
7	White wash	175.28	20	m^2	3505.6
8	Brick required for parapet wall	4000	4	m^3	16000
				Total cost Rs. =	276413.64
		Add 1.5% Water Charge			4146.204
		Add 10% Contractor Profit			27641.36
		Total Estimation cost in Rs.			308201.204



DAIRY PLAN

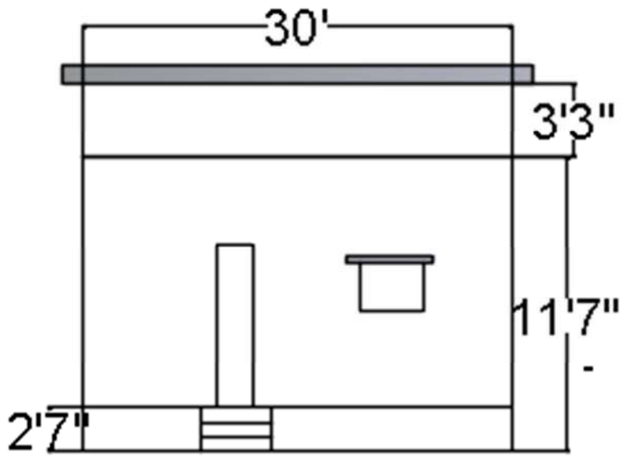


Section A-A'

wall = 9"(all wall should be 9")
staircase width =5'
staircase height =2'7"
w window =5'4"x4'8"
w1 window =5'4"x6'11"
D1 door =4'50"X7'2"
D2 door =3'7"X6'11"

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.(ALL DIMENSION IN FEET)
2)USE M-20 GRADE CONCRETE
3)IT SHOULD GOOD STRUCTURE & FACILITY
4)IT SHOULD HAVE ENOUGH SPACE



Elevation

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	DAIRY
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Fig. - 76 Plan, Section, Elevation of Milk Dairy

13.1.4 BUS STAND

The villagers are using private vehicles for transportation either to cover long distance or short distance and some who cannot afford private vehicle to travel long distance are having trouble in transportation. So bus stand is suggested so that motive of using public transport system is also fulfill and the government bus can also stop there for the passengers. Bus stand also provide shelter to the voyagers during summer, monsoon. Design in AutoCAD software.

Abstract Sheet of Bus Stand

Table – 31 Abstract Sheet of Bus Stand

Sr. No.	Description of Item	Quantity (m^3)	Rate	Per Unit	Total Cost (Rs.)
1	Earthwork excavation	11.08	110	m^3	1218.8
2	Earth filling in foundation	6.66	790	m^3	5261.4
3	Earth filling in plinth	4	790	m^3	3160
4	P.C.C. (1:3:6)	8.1	3000	m^3	24300
9	Brick masonry in foundation C.M.(1:3)	1.55	3000	m^3	4650
10	Bricks masonry in superstructure	6.7	2550	m^3	17085
11	Floor finishing (ceramic tiles)	18.05	650	m^3	11732.5
13	Plaster	5.04	200	m^2	1008
14	Reinforcement (stainless steel)	9.5	4000	m^2	38000
15	Electric bored	1		5000	5000
16	Trash bin	1		400	400
17	Prefabricated shelter (steel)	9.05		200	1810
				Total cost Rs. =	113625.2
		Add 1.5% Water Charge			1704.378
		Add 10% Contractor Profit			11362.52
		Total Estimation cost in Rs.			126692.09

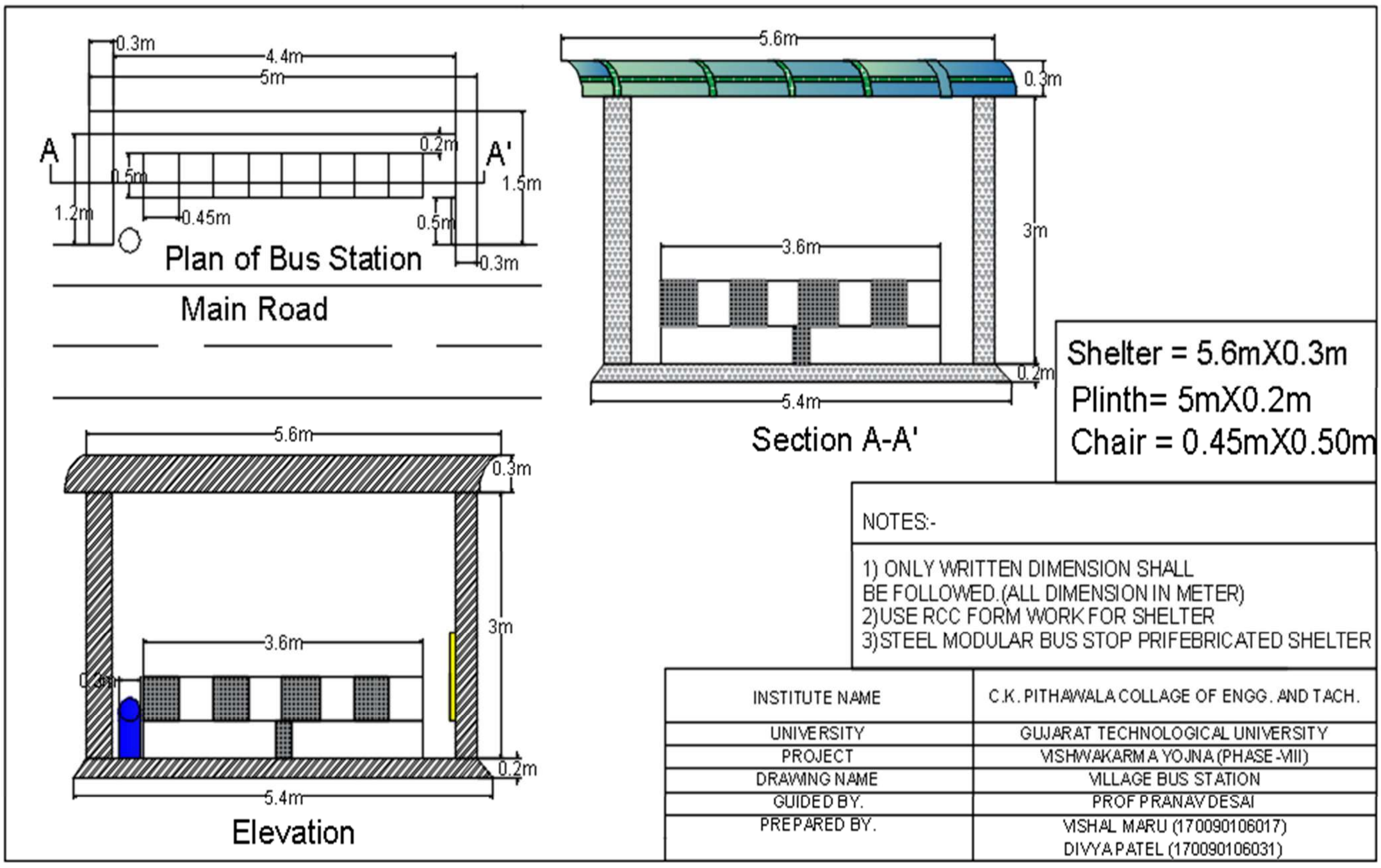


Fig. – 77 Plan, Section, Elevation of Bus Stand

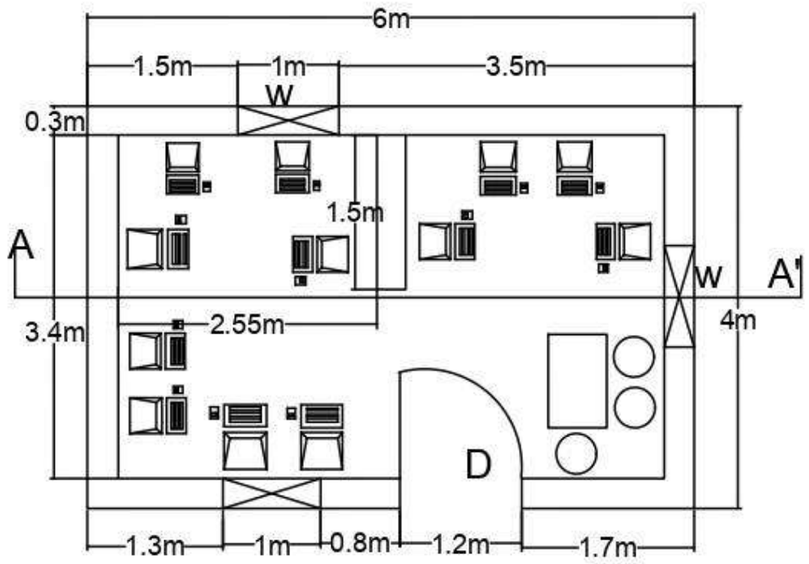
13.1.5 COMPUTER CLASSES WITH CYBER CAFÉ

As the technology is increasing and the work is done by the computer and laptop using rather than manually. So we have chosen this design so that all age group of people can learn how to use computer and various thing on it, cyber café is provided so that the person who are doing job or can operate it for their professional use, and for students it serve as in various study purpose and printing work is also available.

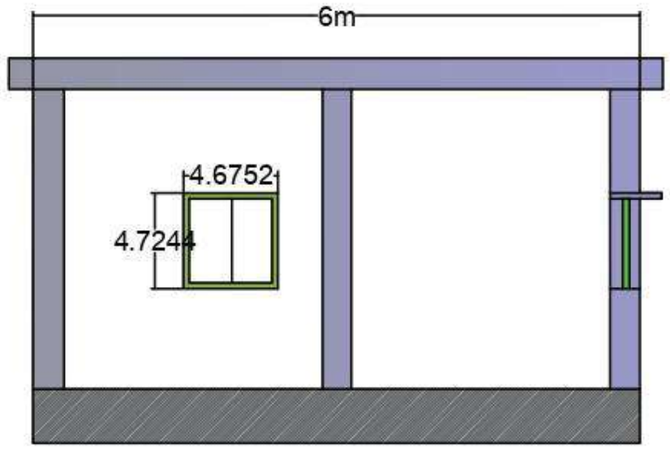
Estimation Sheet of CS & CC

Table – 32 Estimation Sheet of CS & CC

Sr. No.	Description of Item	Quantity (m^3)	Rate	Per Unit	Total Cost
1	Earthwork excavation	40.43	110	m^3	4447.3
2	Earth filling in foundation	2.46	790	m^3	1943.4
3	Earth filling in plinth	7	790	m^3	5530
4	P.C.C. (1:3:6)	2.46	2890	m^3	7109.4
5	D.P.C. (1:2:4)	6.42	110	m^3	706.2
6	Flooring (1:2:4)	1.84	3230	m^3	5943.3
7	R.C.C. slab (M25 grade) (1:1:2)	2.4	3800	m^3	9120
8	Formwork R.C.C.	26.20	170	m^2	4454
9	Brick masonry in foundation C.M.(1:3)	3.30	3000	m^3	9900
10	Bricks masonry in superstructure	15.62	2550	m^3	39831
11	Floor finishing (ceramic tiles)	18.05	650	m^3	11732.5
12	Wall finishing (ceramic tiles)	28	390	M^3	10920
13	Plaster (105.3+40.5+24.08 = 169.98)	169.88	200	m^2	33976
14	Painting (105.3+40.5 = 145.8)	145.8	50	m^2	7290
				Total cost Rs. =	152973.1
		Add 1.5% Water Charge			2129.74
		Add 10% Contractor Profit			14198.31
		Total Estimation cost in Rs.			1,70,300.15



Plan

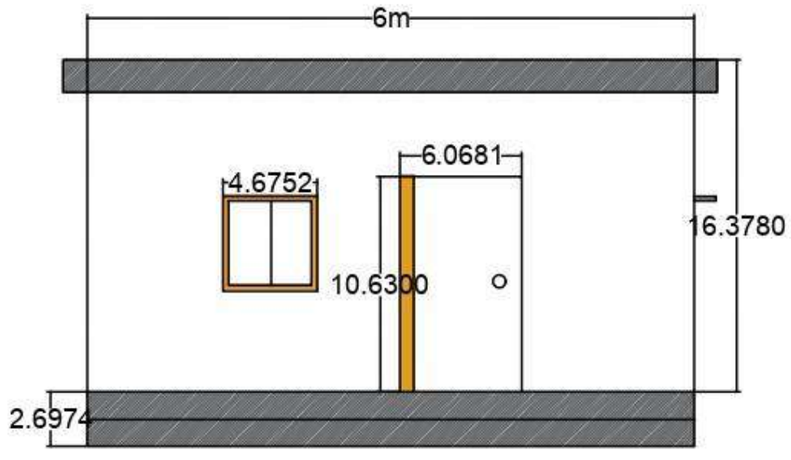


Section A-A'

CS center = 6mX4m
Window W= 1mX1m
Door D= 1.2mX2.1m

NOTES:-

1) ONLY WRITTEN DIMENSION SHALL BE FOLLOWED.(ALL DIMENSION IN METER)
2)USE M-25 GRADE CONCRETE
3) IT HAS SUITABLE NETWORK AREA
4) IT HAS ATTRACTIVE AND GOOD CAPACITY



Elevation

INSTITUTE NAME	C.K. PITHAWALA COLLAGE OF ENGG. AND TACH.
UNIVERSITY	GUJARAT TECHNOLOGICAL UNIVERSITY
PROJECT	VISHWAKARMA YOJNA (PHASE-VIII)
DRAWING NAME	COMPUTER CLASSES WITH CYBER CAFE
GUIDED BY.	PROF PRANAV DESAI
PREPARED BY.	VISHAL MARU (170090106017) DIVYA PATEL (170090106031)

Fig. – 78 Plan, Section, Elevation of Computer Classes with Cyber Café

13.1.6 AGRICULTURE CO-OPERATIVE SOCIETY

As the villagers is engage in agriculture activities aprox.70-80% of the village. So for soil testing, fertilizers distribution and modern technique use for cultivation is guided and conducted there.it is plan out using AutoCAD software.

Estimation Sheet of Agriculture Co-Operative Society

Table – 33 Estimation Sheet Of Agriculture Co-Operative Society

Sr. No.	Description of Item	No.	L (m)	B (m)	H (m)	Quantity (m^3)	Total Qty. (m^3)
1	Earthwork in excavation for Foundation						
	Net C.L. length =48.31 – (0.5*0.90*9) = 40.99m	1	44.26	0.90	1.3	51.78	
						Total =	51.78
2	Brick Bat Cement Concrete (1:4:8) in foundation	1	44.26	0.90	0.2	7.96	
						Total =	7.96
3	Brick masonry up to plinth in C.M. (1:6)						
	First step	1	46.06	0.5	0.3	6.90	
	Second step	1	46.51	0.4	0.3	5.60	
	Third step	1	46.96	0.3	0.3	4.23	
	Fourth step	1	47.41	0.2	0.65	6.20	
						Total =	22.93
	Stair case : First step	1	2.49	0.9	0.15	0.34	
	Second step	1	2.49	0.6	0.15	0.22	
	Third step	1	2.49	0.3	0.15	0.11	
						Total =	0.67
						Net =	23.6
4	Brick masonry above plinth level						
	Length = 48.31-(0.1*9) = 47.41	1	47.41	0.2	3	28.45	
						Total =	28.45
	Deduction for walls						
	Door - D1	1	2.49	0.2	2.20	1.09	
	D2	2	1.10	0.2	2.10	0.92	
	Window	2	1.61	0.2	1.40	0.90	
	Ventilation	1	0.61	0.2	0.61	0.07	
						Total =	2.98
						Net =	25.47

5	Plaster inside the room C.M.(1:3)						
	Cabin	2	1.83		3	10.98	
		2	2.13		3	12.78	
	R1, R2	4	2.13		3	25.56	
		4	6.71		3	80.52	
	W.C.	2	1.83		3	10.98	
		2	1.52		3	9.12	
						Total =	149.94
	Deduction of door and window						
	D1	1/2	2.49		2.20	2.74	
	D2	8/2	1.10		2.10	9.24	
	W	2/2	1.61		1.40	2.30	
						Total =	14.28
						Net =	135.66
6	Brickwork for parapet wall L = 35.76	1	35.76	0.2	1.0	7.15	= 3576 ~ 4000 nos. of brick required

Abstract Sheet of Agriculture Co-Operative Society

Table – 34 Abstract Sheet of Agriculture Co-Operative Society

Sr. No.	Description of Item	Quantity	Rate	Per Unit	Total Cost (Rs.)
1	Excavation in foundation	51.78	90	m^3	4660
2	B.B.C.C. (1:4:8)	7.96	3200	m^3	25472
3	Brick masonry in foundation and upto plinth C.M.(1:6)	23.60	3700	m^3	87320
5	Bricks masonry in superstructure	25.47	4000	m^3	101880
6	Plaster	135.66	200	m^2	27132
7	White wash	135.66	15	m^2	2035
8	Brick required for parapet wall	4000	4		16000
				Total cost Rs. =	264499
		Add 1.5% Water Charge			3967.485
		Add 10% Contractor Profit			26449.9
		Total Estimation cost in Rs.			294916.38 ~ 300000

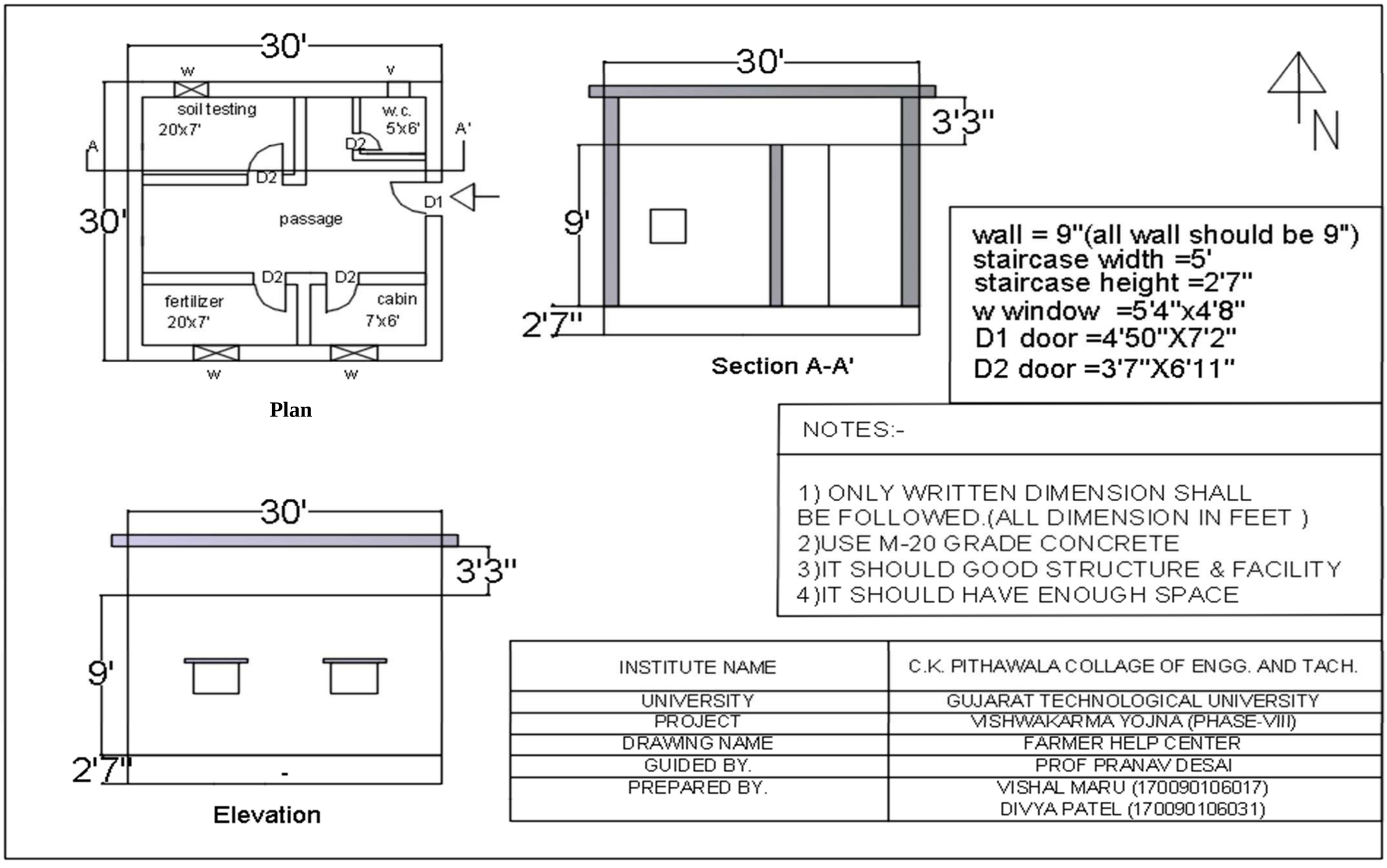


Fig. – 79 Plan, Section, Elevation of Agriculture Co-Operative Society

ELECTRICAL DESIGN

13.1.7 Automated Solar Grass Cutter

The aim of our project is to make the grass cutter which operates on solar energy, hence save the electricity and reduces manpower. In this model use 8051 micro-controller for controlling the operations of a grass cutter. Also the grass cutter has Ultra sonic sensor for obstacle detection. Grass cutter operates automatically hence it does not require skilled person to operate. This project of a solar powered automatic grass cutter will relieve the consumer from moving their own lawns and will reduce both environmental and noise pollution. Ultimately, the consumer will be doing more for the environment while doing less work in their daily lives.

The fully automated solar grass cutter is a fully automated grass cutting robotic vehicle powered by solar energy that also avoids obstacles and is capable of fully automated grass cutting without the need of any human interaction. The system uses 6V batteries to power the vehicle movement motors as well as the grass cutter motor and also use a solar panel to charge the battery so that there is no need of charging it externally.

The grass cutter and vehicle motors are interfaced to an 8051 family micro-controller that controls the working of all the motors. It is also interfaced to an ultrasonic sensor for object detection. The micro-controller moves the vehicle motors in forward direction in case no obstacle is detected. On obstacle detection the ultrasonic sensor monitors it and the micro-controller thus stops the grass cuter motor to avoid any damage to the object/human/animal whatever it is. Micro-controller then turns the robotic as long as it gets clear of the object and then moves the grass cutter in forward direction again.

Fig. – 80 Automated Solar Grass Cutter

Components

- Hardware Specifications
- 8051 Micro-controller
- PCB and Breadboards
- Robotic Chassis
- LED

- Cutting Blade (heavy duty steel with thickness of 2.5 length 7cm)
- Solar Panel (size 60cm*30cm)
- Crystal Oscillator
- Resistors
- Capacitors
- Transistors
- Cables and Connectors
- Diodes
- Transformer/Adapter
- Push Buttons
- Switch
- IC Sockets
- Robotic Chassis

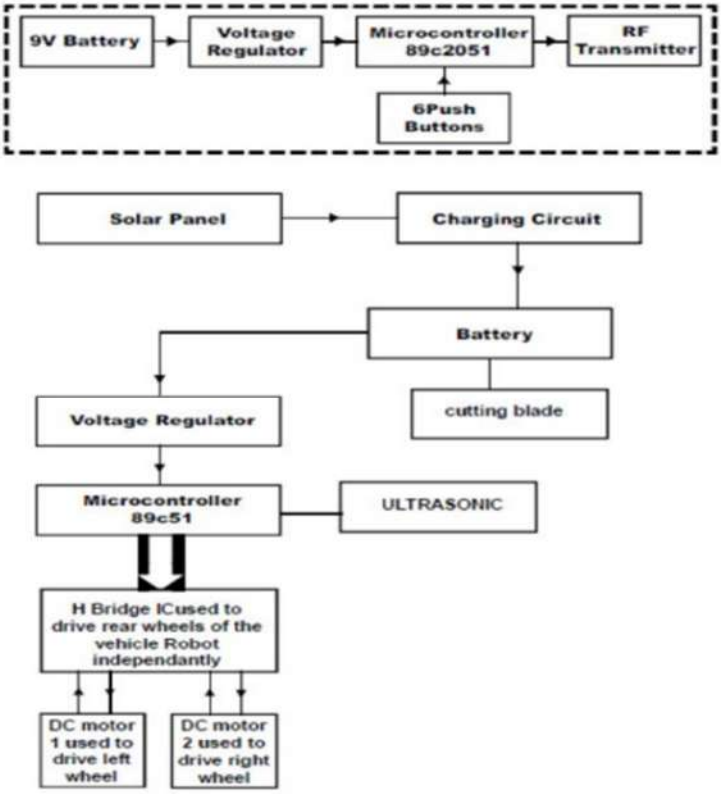


Fig. – 81 Block Diagram of Automatic Grass Cutter

The 10 watts solar panel is used to charge the batteries which are rechargeable. The solar panel gives maximum 18v and 580mA current and need charging circuit between solar panel and batteries .The charging circuit has voltage regulator which regulates voltage to 15v and one transistor to amplify the maximum current to circuit and diode is used .

In this project use 12 voltage battery for entire circuit and another 12v volts for cutting blade. The micro-controller 8051 takes the input from the ultrasonic sensors, when any interrupt or obstacle occurs the ultrasonic sensor senses the obstacle and gives feedback to micro-controller

then according to the program which was given to micro-controller its turns left or right .It waits up to some delay and senses again and same procedure works. If no detection occurs to ultra-sonic range then it moves forward until it finds some detection. B The movement of bot is done by using the two DC motors of 100 rpm.

The motors are driven by using motor driver (L293D) .It is also known as H-Bridge .The main purpose of using motor driver is because that DC motors require the minimum voltage as 9v as input. But the micro controller gives output as only 5v so we require 9v to 12v for driving the motors. So use motor driver which takes 5v as input and gives the 12v for motors .The L293D motor driver drives only two motors which can move in both directions. And the cutting blade is used to cut the grass.to cut any type grass we need high rpm motor, so used 1400 rpm motor for cutting blade .The motors runs directly by 12v rechargeable battery .The DPDT switches are used for movement of bot and cutting blade separately.

Advantages

- No fuel consumption
- Pollution free
- No. Of Reciprocating parts are less
- Compact size and portable
- Easy to move from one place to another place
- Operating principle is simple
- Non skilled person also operate this machine

Applications

- Playgrounds
- House gardens
- Small farms
- Nurseries

Cost

This solar grass cutter total making price is 7000-8000 INR.

13.1.8 SMART STREET LIGHT

This smart street light system consists of a LED light, a brightness sensor, a motion sensor and a short-distance communication network. The lights turn on before pedestrians and vehicles come and turn off or reduce power when there is no one. It will be difficult for pedestrians and drivers of vehicles to distinguish our smart street lamps and the conventional street lights, since our street lamps all turn on before they come. The present status and the future prospects of our smart start light project will be reviewed.

The main objective of the project is to develop a smart street light system which reduces the consumption of electricity by using effective ways. The project will be designed by using an Arduino UNO board, LDR, IR sensor and Bread board. Smart street lights are effective and extremely dependable.

The two sensors, LDR (light dependent resistor) and a IR sensor, the role of these sensors in the project is to detects the intensity of atmospheric light and accordingly the street lights will

switched on and also when detects an object coming towards the street light and it sends the message to the serially connected street lights through the cloud so that every street light in the particular serial will be automatically switched on. We will be using Internet of things (IoT) as the main technology in the project, since the main role of this technology is to enable the connectivity between any livings or non-living things to the internet.

Components use for Smart Street light

LDR (Light Detecting Resistor)

LDR is the one of the main component in the project.so, the main reason and objective of using this LDR because it has a resistance which usually changes with the amount of light or the light intensity that falls on the LDR or even absorbed by it, this main feature of LDR makes it as one of the super main component which has to be used in any light sensing devices and projects. The LDR can also be called as light sensitive devices.

IR Sensor

The IR sensor is called as the infrared sensor, we can say that it is an electronic device which can easily measure the heat of the object and also it has the ability to detect the motion, which we can state as motion detection, this kind of sensors only detect and sense the infrared radiation. As, the infrared rays are invisible to our eyes, they can be detected using the IR sensors.

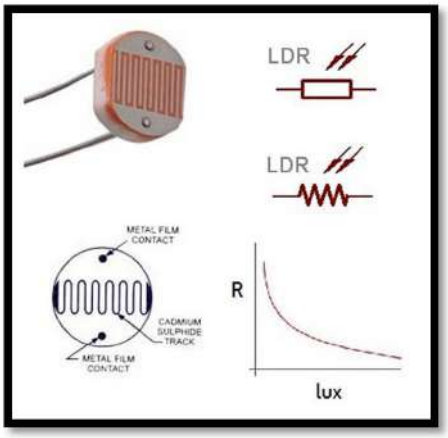


Fig. – 82 Light Detecting Resistor

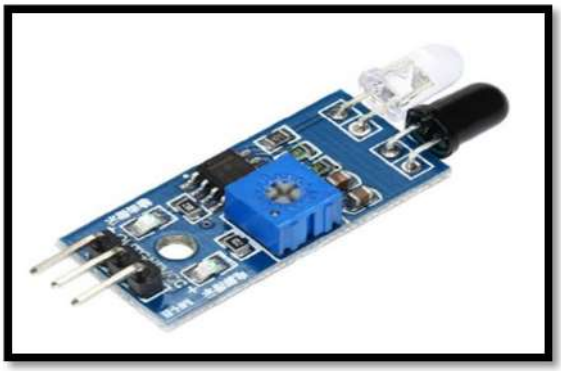


Fig. – 83 IR Sensor

Bread board

A bread board is called so because previously it was used for the slicing of the bread later a solder less bread board came into use. The bread board consists of clips which are called as tie or contact points, the clips will be maintaining a gap of 2.54mm between each one of them. They connect from one pin to the other pin using metal strips. Shown in fig. 85.

Block diagram

The above shown (fig-86) flowchart briefly and clearly depicts the way on how the project is designed and also how the step by step process of the project and is working. Firstly in the experiment the LDR detects the amount of light energy that it has been receiving or that can also say that it detects the presence of the light that is the reason why it is called as light detecting resistor and when the LDR also detects the light it sends an signal to the microcontroller which in

this project is the Arduino UNO board, after receiving the signal from the LDR and microcontroller performs its function which in this case is to switch on the LEDs which are connected to the Arduino board through the bread board using jump wires.

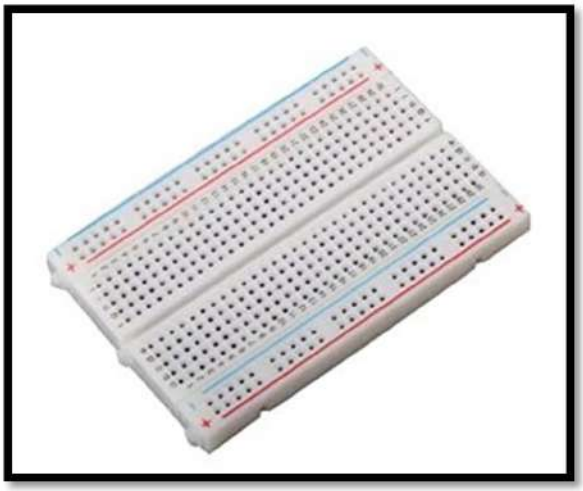


Fig. – 84 Beard Board

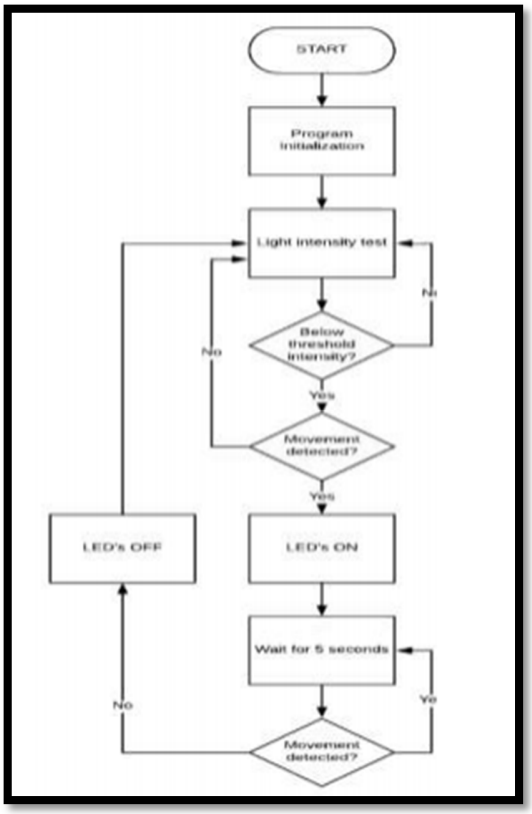


Fig. – 85 The Flow Chart For System

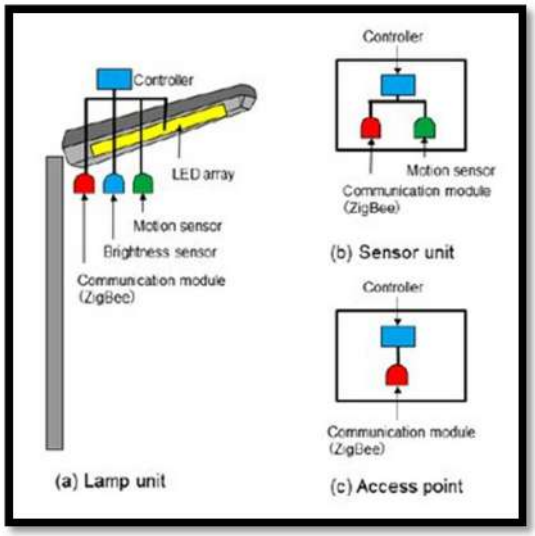


Fig. – 86 Units of Light

So, now the lights will be turned ON, and they will be turned OFF again when the LDR or the IR sensor will not receive any kind of input from the light which is the sunlight or the atmospheric light, as during the night time there will be no sunlight or any atmospheric light the street lights will be tuned ON the whole night, in our proposed system of project we have found a solution even to this problem, which can again be solved using the IR sensor, since the IR sensor can even detects the motion of the objects, and we will be using this feature of the IR sensor to reduce the amount of energy that is consumed even in the night time through the street lights as our main aim of the project is to reduce the consumption of the electricity.

Let us begin and learn how to use the IR to reduce the power consumption even during the night time, As we know that the IR sensor can also detect the motion of the object, so as soon as any vehicle gets closer to the street light the IR sensor which is present in the light sends an signal to the microcontroller which automatically turns ON the street light and also sends the same message to all the street lights which are connected in series, which makes it switch ON all the street lights in the series, and they gets turned OFF when the vehicle leaves, by following this kind of approach we can minimize the consumption of the electricity more and more.

Assumptions

- 5 km diameter of Village Street contains 55 street lights and the nominal range of all
- The street lights are supposed to glow for a period of 12 hour from 6 pm to 6 am. One street light is supposed to consume 0.3 kWh power for a period of 1 hour when it glows with its maximum intensity so that one street light consumes maximum 3.6kwh in a day.
- So 55 street lights consume maximum 3.6kwh*55=198kwh power in a day. If we exchange to smart street light.

Case-1: (Let one vehicle is in motion during night)

If two Street light glows per one IR sensor

Than power consumed by two Street light = 2*0.3kWh = 0.6kWh

Maximum of only two street light glow for one vehicle movement.

Therefore, Total power consumed for 12 hrs. = 0.6kWh*12 = 7.2 kWh

Total power saved = 198kWh - 7.2kwh =190.8 kWh

Case-2: (from 5am to 6am and 12 pm to 1 am; let only 10 vehicles are in motion)

If 10 vehicle crosses the street light one by one; than total of 20 street light glows per 10 IR sensor

Therefore, power consumed by 20 Street light = 6kWh

Total power consumed in 12 hrs. = 6kwh*12 = 72 kWh

So, total power saved = 198kWh - 72kwh = 126 kWh

Case-3: (from 7pm to 12am; let only 20 vehicles are in motion)

If 100 vehicle crosses the street light one by one; than total of 200 street light glows per 1.00 IR sensor

Therefore, power consumed by 40 Street light =12 kWh

Total power consumed in 12 hrs. = 12 kWh*12 = 144 kWh

So, total power saved = 198kWh -144kwh = 54 kWh

Advantage

- Save energy by turning off light when vehicles is not detected.
- Easy to install in office, houses, streets, roads.
- Complete elimination of manpower.
- Reduced energy cost.
- Reduced greenhouse gas emissions.
- Reduced maintenance cost.

Cost

This model cost around 2000-2500 INR.

13.1.9 LPG Gas Leakage Detector

Liquefied Petroleum Gas (LPG) is a main source of fuel, especially in urban areas because it is clean compared to firewood and charcoal. Gas leakage is a major problem in the industrial sector, residential premises, etc.in our village 95% houses use LPG gas. Nowadays, home security has become a major issue because of increasing gas leakage. Gas leakage is a source of great anxiety with ateliers, residential areas and vehicles like Compressed Natural Gas (CNG), buses, and cars which are run on gas power. One of the preventive methods to stop accidents associated with the gas leakage is to install a gas leakage detection kit at vulnerable places. The aim of this paper is to propose and discuss a design of a gas leakage detection system that can automatically detect, alert and control gas leakage. This proposed system also includes an alerting system for the users. The system is based on a sensor that easily detects a gas leakage.

Gas leakage is a serious problem and nowadays it is observed in many places like residences, industries, and vehicles like Compressed Natural Gas (CNG), buses, cars, etc. It is noticed that due to gas leakage, dangerous accidents occur. The Liquefied petroleum gas (LPG), or propane, is a flammable mixture of hydrocarbon gases used as fuel in many applications like homes, hostels, industries, automobiles, and vehicles because of its desirable properties which include high calorific value, less smoke, less soot, and meager harm to the environment. Liquid petroleum gas (LPG) is highly inflammable and can burn even at some distance from the source of leakage.

This energy source is primarily composed of propane and butane which are highly flammable chemical compounds. These gases can catch fire easily. In homes, LPG is used mainly for cooking purposes. When a leak occurs, the leaked gases may lead to an explosion. Gas leakage leads to various accidents resulting in both material loss and human injuries. Home fires have been occurring frequently and the threat to human lives and properties has been growing in recent years. The reason for such explosions is due to substandard cylinders, old valves, no regular checking of gas cylinders, worn out regulators and a lack of awareness of handling gas cylinders. Therefore, the gas leakage should be detected and controlled to protect people from danger. A deodorant such as ethane thiol is added to LPG, so that leaks can be detected easily by most people. However, some people who have a reduced sense of smell may not be able to rely upon this inherent safety mechanism. A gas leakage detector becomes vital and helps to protect people from the dangers of gas leakage.

Semiconductor sensors are used to detect LPG gas. An MQ6 semiconductor sensor is used. Sensitive material of the MQ-6 gas sensor is SnO2, which has lower conductivity in clean air.

When the target combustible gas exists, the sensor conductivity increases along with the rising gas concentration. The MQ6 gas sensor has a high sensitivity to Propane, Butane and LPG, and response to Natural gas. The sensor could be used to detect different combustible gasses, especially Methane; it has a low cost and is suitable for different applications. The MQ-6 can detect gas concentrations anywhere from 200 to 10,000 ppm. The sensor's output is an analog resistance. Figure 88 shows the block diagram of the gas leakage detection and alert system.

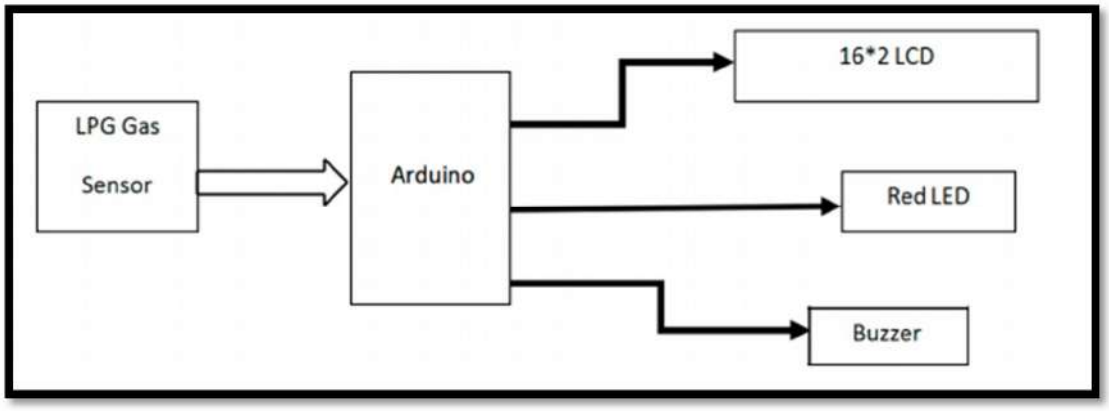


Fig. – 87 Block Diagram of Gas Leakage Detection System

This system is based on Arduino UNO R3 and MQ-6 gas sensor. When the sensor detects gas in the atmosphere, it will give digital output 1 and if gas in not detected the sensor will give digital output 0. Arduino will receive the sensor output as digital input. If the sensor output is high, then the buzzer will start tuning along with the LCD that will show that "Gas detected: Yes". If the sensor output is low then buzzer will not be tuning, and the LCD will show that "Gas detected: No". The buzzer most commonly consists of a number of switches or sensors connected to control unit that determines which button was pushed or whether a preset time has lapsed, and usually illuminates a light on the appreciate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound.

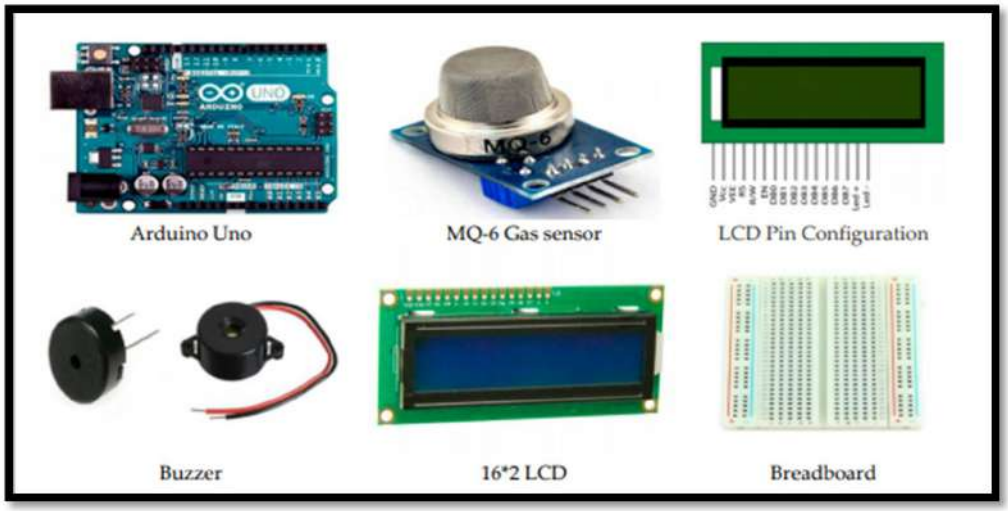


Fig. – 88 Components Use for the System

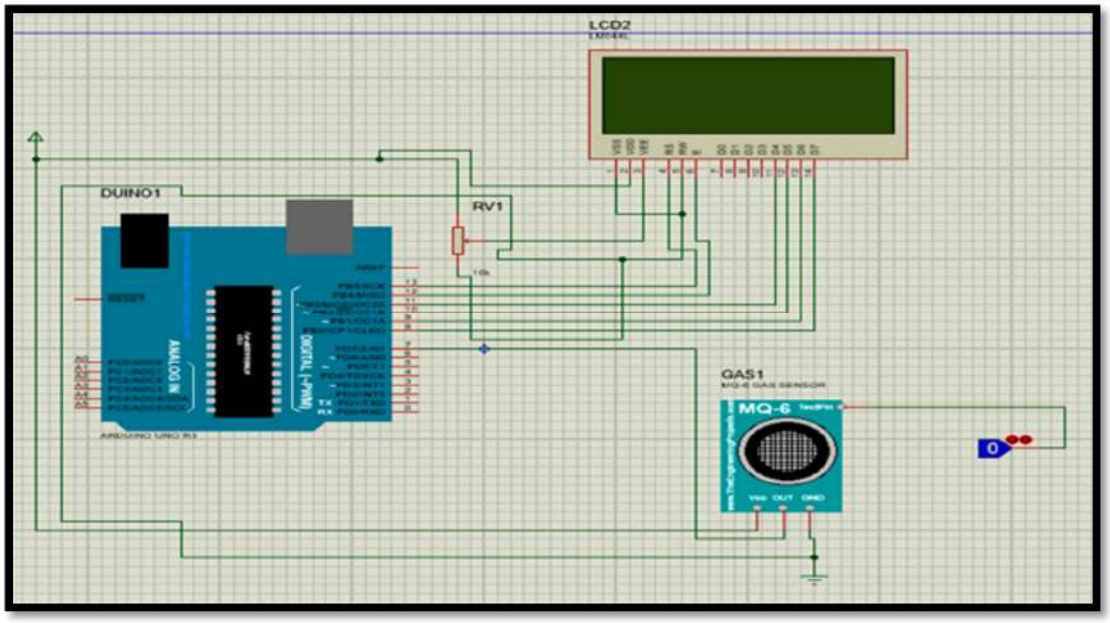


Fig. – 89 Circuit Diagram of Gas Leakage Detection System

Cost

- Arduino Uno R3 --- 420/-
- MQ-6 LPG gas sensor --- 160/-
- 16*2 LCD --- 124/-
- Buzzer--- 15/-
- Male to male/female wire --- 60/
- 9 V Battery --- 40/-
- Gas Lighter --- 35/-
- 10 K Variable Resistor --- 8/-
- Mini Breadboard --- 55/-
- Total cost --- 917/-

Advantages

- It is used in house as LPG leakage detection.
- The system is highly reliable and temper proof and secure.
- In the long run maintenance cost is very less.
- It is possible to get high instantaneous result and very high accuracy.

Applications

- Home security -can be used in home to prevent accidents due to gas leakage
- Industrial security - can be used in sensitive area to prevents any accidents

13.2 Reason for Students Recommending this Design

This design is recommended because in the future the requirement of the village will be as below:

- To Improve Medical & Recreational Facility.
- Irrigation System of Village.
- Awareness of the Renewable Energy Sources.
- To improve the method of proper maintenance of the existing structures.
- To Improve Transportation Facility.
- To Improve Life Standard Of People.
- To Improve Education Facility.
- Improve Water Supply Facility.
- Develop Veterinary Business By Providing Useful Facility.
- The System Of Solid Waste Management Should Be Properly Developed.
- Design The Other Physical, Socio-Economic And Socio-Cultural Amenities In Village.
- To stop power theft in the village.
- To create employment opportunities.
- To create awareness for self-employment in the village.

13.3 About designs Suggestions / Benefit of the villagers

Design and provision for infrastructure facility

- Low cost toilet – to facilitate the public toilet and sanitation.
- Furrow irrigation system – excess of water is not wastage and saved.
- Reconstruction of Anganwadi – provide space and well maintain facilities for the children's.
- Overhead water tank (rectangular) – to increase the water storing capacity & to fulfill the water requirement of the villagers.
- Biogas plant – use for getting natural fertilizer for farm and produced methane gas for cooking.
- Health center – to get proper medical facility to the villagers.
- Reconstruction of panchayat building –
- General market – easy to reach for the food, stationary & medicines in the shop.
- Reconstruction of milk dairy – better way of connectivity for milk distribution and supply.
- Bus stand – provide attention to the bus driver for the stop, connectivity between village and cities and provide shelter for the travelers.
- Computer classes with cyber café – anybody can learn computer and any technical work required internet and printing is facilitate.
- Agriculture co-operative society – to promote agriculture activities.

CHAPTER 14. TECHNICAL OPTIONS WITH CASE STUDIES (EXPLAIN ALL TOPIC AND FOR MINIMUM ONE TOPIC EXPLAIN NEW CONCEPT, DESIGN, PROTOTYPE MODEL WITH ACTUAL COST ESTIMATION)

14.1 Civil Engineering

14.1.1 & 14.1.2 Advanced Earthquake Resistant & Seismic Retrofitting of Buildings

Earthquake resistant design of buildings depends upon providing the building with strength, stiffness and inelastic deformation capacity which are great enough to withstand a given level of earthquake-generated force. This is generally accomplished through the selection of an appropriate structural configuration and the careful detailing of structural members, such as beams and columns, and the connections between them. But more advanced techniques for earthquake resistance is not to strengthen the building, but to reduce the earthquake-generated forces acting upon it.

Earthquake Resistant Design Techniques for Buildings and Structures

Among the most important advanced techniques of earthquake resistant design and construction are: Base Isolation, Energy Dissipation Devices

Base Isolation Method

A base isolated structure is supported by a series of bearing pads which are placed between the building and the building's foundation. A variety of different types of base isolation bearing pads have now been developed. The bearing is very stiff and strong in the vertical direction, but flexible in the horizontal direction.

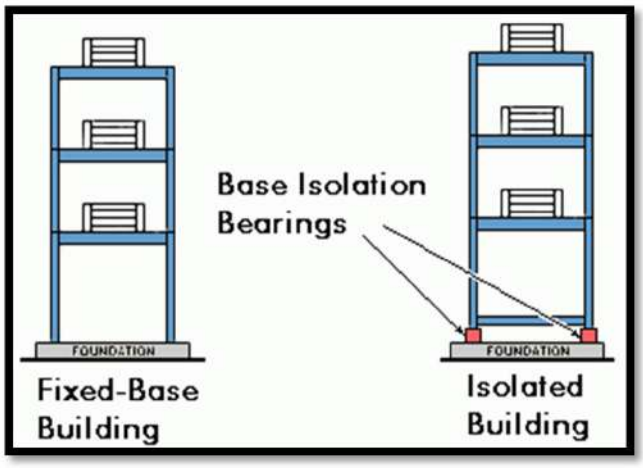


Fig. – 90 Base-Isolated and Fixed-Base Building

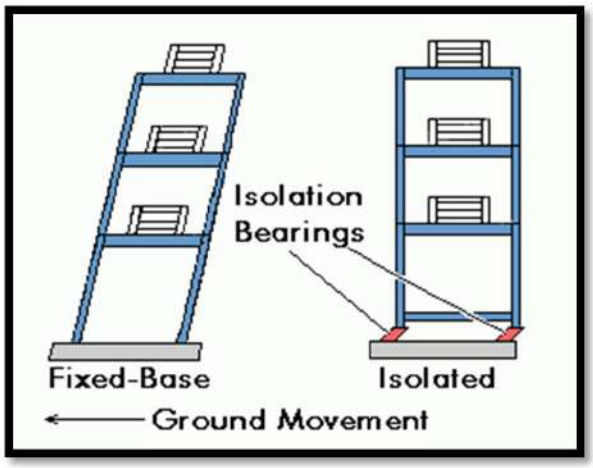


Fig. – 91 Base-Isolated, Fixed-Base Buildings

Top Seismic Technologies to Build Earthquake Resistant Structures

- Floating Foundation: The levitating or floating foundation separates the substructure of a building from its superstructure

- Shock Absorption
- Rocking Core-Wall
- Pendulum Power
- Symmetry, Diaphragms and Cross-Bracing
- Finally

Floating Foundation

The levitating or floating foundation separates the substructure of a building from its superstructure. One way of doing this is by floating a building above its foundation on lead-rubber bearings that comprise a solid lead core covered in alternating layers of rubber and steel. The bearings are attached to the building and its foundation with the help of steel plates. So, when an earthquake occurs, the floating foundation can move without moving the structure above it.

Symmetry, Diaphragms and Cross-Bracing

Generally one common criterion for seismic designs is symmetry. Seismic risks of asymmetrical designs are higher. L-Shaped, T-Shaped and split-level structures may be more visually appealing but they are also prone to torsion. Thus engineers design symmetrical structures to keep the forces equally distributed through the structure and limit ornamental elements like cornices, cantilever projections etc. An earthquake has a significant lateral force. Seismic designing counteracts these forces in both horizontal and vertical structural systems. Diaphragms are integral to horizontal structures – such as floors of a building or roof. Engineers design each diaphragm on its own deck and strengthen it horizontally so it can distribute sideways forces with vertical structure parts. With vertical structures, engineers have several approaches. Braced frames are often used in building walls. Braced frames rely on trusses for resisting sideways motion. Cross-bracing is a technique that uses two diagonal members in an X-shape to build wall trusses and it is a popular technique to build earthquake resistant structures.

Fig. – 92 Advanced Earthquake Resistant

Seismic Retrofitting of Buildings

Seismic retrofitting is the modification of existing structures to make them more resistant to seismic activity, ground motion, or soil failure due to earthquakes. Seismic retrofitting of structures

- Generally, the structural retrofit of concentrically braced frames improved the seismic resistance of the building and it can be considered in the retrofit of moment frame structures to prevent the risk of structural collapse under the design load with much more confidence.

Retrofitting techniques

Global

- Adding shear wall
- Adding infill wall
- Adding bracing
- Adding wing wall
- Wall thickening
- Mass reduction
- Base isolation
- Mass dampers.

Local

- Jacketing of beams
- Jacketing of columns
- Jacketing of beams-columns joints
- Strengthening of individuals footings

14.1.3 Advance Practices in Construction field in Modern Material, Techniques and Equipment's

The equipment with proven utility in building construction may be as listed below

- Chain and pulley block.
- Grouting pumps.
- Sprayers for painting work.
- Tile cutters.
- Portable hand drilling machines.
- Horizontal trolleys, wheelbarrows.
- Pumps.
- Vibrators for compaction of concrete, surface vibrators.
- Auto ramming concrete block machine.
- Sand washing machine.
- Vertical lifts, hoists, winches.
- M.S. tubular scaffolding, and formwork.
- Concrete mixers.
- Cranes.
- Earth excavators.
- Earthmovers.

Modern methods of curing are adopted. Advanced adhesives and chemicals are used.

- Chain and pulley block.
- Grouting pumps.

- Sprayers for painting work.
- Tile cutters.
- Portable hand drilling machines.
- Horizontal trolleys, wheelbarrows.
- Pumps.
- Vibrators for compaction of concrete, surface vibrators.

8 Modern Building Construction Techniques

- 3D Volumetric Construction.
- Precast Flat Panel Modules.
- Tunnel Formwork System.
- Flat Slab Technology.
- Pre-cast Foundation Technique.
- Hybrid Concrete Building Technique.
- Thin Joint Masonry Technique.
- Insulating Concrete Formwork (ICF) Technique.

3D Volumetric Construction

Using this modular construction technology, 3D units are produced in controlled factory settings using needful construction and building materials. Finished units are transported to site in various modules, basic structural blocks or final touched up units with all amenities installed, for assembly. Blocks can be erected rapidly at site and properties of concrete like fire retardant, sound resistivity, thermal mass etc. are retained.

Thin Joint Masonry Technique

Utilization of this technique leads to the reduction of the quantum of mortar applied by slashing it depth from 10mm to lesser than 3mm. Consequently, mortar can be laid swiftly with enhanced productivity on the longer wall panels. With large sized concrete blocks, higher construction efficiency along with significant cost reduction can be achieved. Within a single day, the number of mortar courses laid is higher as curing of mortar takes place quickly without compromising on bonding strength resulting in the elimination of floating problem.

Material Uses Advantages

- High Performance Conc. Beam. On long span structures like bridges and halls
- Light Transmitting Conc. Interior walls. Energy Saving
- Pervious Conc. Paving, Parking, Walkways. Will be permeable for water supporting water table recharge
- Floating Conc. Marine architecture. Will save construction cost
- Weave Metal Mesh. Half walls, Fences, Acoustic walls. Cost and time effective
- Aerogel. Skylight, Thermal panels. Heat resistive, transparent
- Super Black. Paints, Varnishes and Finishes. Less Reflective, absorptive
- Banner work. Shading device, Landscape element. Time, Cost, Energy efficient Geoweb.
- Vertical Gardening, Green walls. Energy conserving, Water conserving
- Framing Track. Flexible boundaries and Fences. Quick and versatile
- 3D Molded Plywood. Furniture, Formworks. Time Saving, Repetitive design.

Fig. – 93 3D Volumetric Construction

Fig. – 94 Thin Joint Masonry Technique

The Need for an Environmental Impact Assessment

An Environmental Impact Assessment is a formal method of judging the impact that any new developmental project would have on the environment and its constituents. This can include changes that the project would create in the physical aspects of existing geography, chemical changes to the atmosphere including air and water, biological changes that affect plant, animal and human life, cultural impact of a project on the society in the area, and other socio-economic effects that the project can have.

Such an assessment allows problems to be foreseen, so that the design and planning of the projects is modified to reduce any negative effects. It is now fashionable to build green buildings which have a positive effect on the environment. There is historical precedent for the now mandatory Environmental Impact Assessments (EIA). Past efforts by governments have resulted in bans on activities that caused noxious odours, garbage dumps were positioned at places far away from habitation, and commercial activities were restricted to town centres.

Objectives of Environmental Impact Assessment

The objective of an EIA is to predict the environmental impact project would have on all aspects of the environment. Once this is done, a study has to be made to see if the impacts can be reduced in any way. The project has then to be modified to suit the local environment and all predictions and likely options presented to decision makers for final decisions.

Environmental Aspects

The environmental aspects are defined as the elements of an operation or project's activities, products, or services that can or does interact with the environment. The key environmental aspects associated with the Project are presented in below.

Table – 35 Environmental Aspect

Project Component	Environmental Aspect
Construction Activities – Site Preparation	Soil clearing and land levelling
	Transport and equipment use
	Purchase and delivery of construction materials and services

	Staffing
Construction Activities – Civil Works and Mechanical Erection	Worker's temporary accommodation
	Excavation and earthworks for Plant foundation and buildings
	Transport and use of vehicles and construction equipment
	Construction of infrastructure OSBL (outside Plant Battery limits) including freshwater intake pipeline
	Plant equipment testing and start-up/commissioning
	Waste disposal
Operation Activities	Operation of ammonia and urea process plants
	Operation of freshwater intake pipeline
	Traffic operation for ingress and egress from Plant site
	Traffic operation for transport of urea product ex Plant site
	Waste disposal
Accidental (no routine) Events	Fire and explosion
	Spills and leaks

The environmental impact resulting from an environmental aspect can be positive or negative. A number of the impacts for this Project are actually positive.

14.1.5 Water Supply-Sewerage system-Waste Water- Sustainable development techniques

Functions of the Department

- Long-term Planning, Design & Implementation & Monitoring of various Water Supply Schemes according to Master Plan.
- Implementation of various water supply projects like- augmentation of new sources of water, development of new water works/ water distribution stations, increasing capacity of existing water treatment plants/ Intake wells/ underground tanks, Construction of overhead tanks, design, procurement & laying of transmission pipelines and distribution pipelines, procurement & installation of valves etc. is carried out by floating public tenders & appointing capable contractors as approved by the competent sanctioning authority of Surat Municipal Corporation.
- Issue of new licenses & renewal of existing licenses for plumbers.
- Providing water tankers in the deficient area and where any complaints are received about quality/quantity of water supplied through pipeline.
- Maintenance of all the water works, water treatment plants water distribution stations, valves, transmission pipelines and distribution pipelines is done either departmentally or by appointing private participants.

Water Supply System - Year 2011 TO 2015 (Present)

- In this period, water supply projects worth Rs.144 Crores were sanctioned under JnNURM scheme for newly merged eastern area of city.
- In January 2011, 50 MLD water treatment plant was commissioned at Rander water works under JnNURM at a project cost of Rs.760 Lacs.

- Water Supply Scheme (part) for Amroli, Kosad, Chhaprabhatha area of New North Zone of Surat was commissioned and inaugurated by Honorable Chief Minister of Gujarat, Shri Narendrabhai Modi on Dt.27-05-2012. Total cost of different packages was Rs.50.06 Crores.
- Intake well of 360 MLD capacity at Sarthana & 263 MLD at Katargam were commissioned at total project cost of Rs.33 Crores.
- In January 2013, 90 MLD capacity fully automatic water treatment plant with SCADA was commissioned at Kosad Water Works at a total project cost of Rs.16.47 Crores.
- UGSR of 150 Lacs Liters capacity with booster house at Rajashri Hall, Central zone was commissioned at total project cost of Rs.4.90 Crores.
- 3 UGSR of total 163 Lacs Liters capacity with booster house with total project cost of Rs.8.58 Crores were commissioned in 2012-13 for water supply scheme of New South-East area of Surat under JnNURM.
- 3 UGSR of total 245 Lacs Liters capacity with booster house with total project cost of Rs.13.97 Crores for water supply scheme under Swarnim Jayanti Mukhya Mantri Shaheri Vikas Yojana for Puna, Simada, Sarthana area were inaugurated by Honorable Minister Smt. Anandiben Patel in April 2013.
- In Year 2012-13, 18 ESR of total 423 Lacs liters were commissioned for New North & New South east area of Surat under JnNURM at total project cost of Rs.37 Crores.
- In Year 2013-14, construction work for 4 UGSR of total 275 Lacs liters capacity and 6 ESR of total 114 Lacs liters capacity was completed at a total project cost of Rs.20.80 Crores.
- In year 2014-15, 200 MLD Intake well, 32 MLD WTP, 88 Lacs liters capacity UGSR with booster house (WDS-1), 3 Elevated Service Reservoirs and associated pipelines were commissioned at Mota Varachha with a total project cost of Rs.53 Crores as a part of 24 x 7 water Supply scheme for New North area.
- In year 2014-15, 2 Water Distribution Stations WDS SE-3 & SE-4 with total 100 Lacs liters capacity UGSR with booster house, 4 Elevated Service Reservoirs with total 96 Lacs liters capacity and associated pipelines were commissioned at Unn, Vadod, Dindoli, Godadara with a total project cost of Rs.34.54 Crores as a part of 24 x 7 water Supply scheme for New South-East area.
- By fast-tracking the implementation of projects, SMC has achieved 30% increase in water supply from 750 in 2010 to 980 in 2015.
- SMC is now poised to achieve the goal of 100% coverage of extended area & population by year 2016.

Table – 36 Surat Water Supply (SMC)

Sr. No.	Water Supply Project	Year 2010-11	Year 2014-15	Year 2015-16
1	Intake Well (in MLD)	840	1663	2033
2	Water Treatment Plants (in MLD)	1178	1300	1468
3	UGSR Capacity (in Lac lit)	6300	6908	6908
4	ESR Capacity (in Lac lit)	202.5	1039	1207
5	Pipeline (in km)	2550	3250	3350

Fig. – 95 Graph of Increase Capacity and Expenditure

Fig. – 96 Surat Water Supply Plant Katargam

Name of the Project

Design, Construction, Erection, Testing and commissioning of (i) Augmentation of existing Sewage Pumping Station, (ii) Augmentation of existing 66 MLD up to 167 MLD Capacity STP for 10 Years Period Under SMART CITY, Surat.

Background

The main objective of sewage treatment is to stabilize decomposable organic matter present in sewage so as to produce an effluent and sludge which can be disposed of in the environment without causing health hazards or nuisance. The sewage treatment plant is designed to deliver the wastewaters conforming to the standards specified by the CPHEEO manual / Ministry of Environment / Gujarat Pollution Control Board for discharge in the water bodies. The treated sewage will be disposed of into Bhedwad Khadi.

At present, there is sewerage system in total 2068 hectares area of Dindoli Drainage Zone. At present, there is 66 MLD capacity sewage treatment plant at Dindoli under Dindoli Drainage Zone, which is running at 40 MLD sewage flow. However, considering the pumping station and rising main augmentation work going on at present, it is forecasted that more than 150 MLD sewage will reach the STP within a year. Moreover, the revised and more stringent standards as per GPCB, require removal of nutrients, such as Nitrogen and Phosphorus, for compliance as well. Hence, up gradation of existing 66 MLD STP is considered under this project report.

Further, as per development within the project area and as per population forecast, the STP would be receiving more than 150 MLD within a year. Hence, considering design period of 15 years, the augmentation up to 167 MLD is required. Hence, considering future diversion of sewage to another STP, new STP of 101 MLD is proposed with total augmentation up to 167 MLD is considered. The wastewater after treatment will be disposed off in to the Bhedwad creek.

Vision

The followings are the main reasons for the novation of existing sewage treatmentplant at Dindoli.

The sewage flow at existing STP is in the range of about 40 MLD against the capacity of 66 MLD. However, considering the pumping station (306 MLD) and rising main augmentation work going on at present, it is forecasted that more than 150 MLD sewage will reach the STP.

The disposal standards of existing STP is for removal of organic matter and suspended solids only, i.e. for only BOD and SS removal. Hence, the disposal standards shall have to be upgraded as per the latest revised manual of CPHEEO on sewage treatment. The revised disposal criteria as specified by the CPHEEO manual, published in the year 2012, also requires the treatment level of Nutrient removal also. The revised GWSSB SOR also focusses on the need of removal of nutrient and phosphate removal. The GPCB has also revised the disposal norms during last year 2015. The revised standards as per the revised manual of CPHEEO, GPCB guidelines and as proposed under this project is shown in the Table below.

Table – 37 Treated Sewage Characteristics as per CPHEEO Manual - 2012			
Sr. No.	**Parameters**	**Unit**	**Treated Effluent**
1	BOD_5	mg/l	≤ 10
2	Suspended Solids	mg/l	≤ 10
3	TN	mg/l	≤ 10
4	Dissolved P	mg/l	≤ 2
5	Fecal Coli Form Count	MPN/100 ml	≤ 230

Sector

Drainage Department

Funding pattern

SCP Cost :Rs. 52 Cr.

DPR Cost :Rs. 139.64 Cr.

Tender Sanctioned Cost Rs. 131.31 Cr.

Convergence Scheme/PPP/SMC:

Convergence/PPP/SMC Costing Rs. 79.31 Cr SMC

Brief Description (Technical Details)

The major treatment units proposed to be provided for augmentation of 101MLD STPplant comprise of the following as minimum requirement:

Table – 38 Technical Details			
Sr. No.	**Name Of Unit**	**No.**	**Size (In "Meter")**
1	Inlet Chamber	02	6.9 m x 6.9 m x 3.0 m LD
2	Screen Channel	04	1.50 m wide x 1.3 m LD
3	Grit Trap	04	10 m x10 m x 1.5 m SWD
4	SBR with Diffused AerationSystem	06	46.5 m x 46.5 m x 5.5 m SWD
5	Chlorine Contact Tank	01	28 m x 28 m x 3 m LD
6	Mechanical Sludge Dewatering System–Centrifuge (New)	01	As per Design
7	Air Blower Room	01	30m x 6m x 4m height (minimum)
8	H.T./L.T. Room	01	As per Design
9	Anaerobic Sludge Digesters	02	23.0 m dia. x 10.0 m SWD
10	Aeration Tanks With IFAS	03	

Specialty/Benefits

Table – 39 Specialty Benefits		
Energy	Bio gas power plant will save electricity expenses.	
Revenue	Saving in revenue due to captive power plant can be utilized in other Services.	
Smart Solution	Control through SCADA maintenance of machines	System will add accuracy and reduce
Employment	Additional skilled employees shall be required.	

Implementation plant

Current status of the project implementation: Work in progress.

Likely completion date of project:-07/10/2019

Proposed Site Plan (Google Map)

Fig. – 97 Site Plan Dindoli

14.2 Electrical Engineering

14.2.1 Design of Power Electronics converter

Nowadays, power electronic converters play an essential role in the majority of consumer electronic devices and are widely used in industrial applications. Since most of these applications are supplied through the AC grid, the use of rectifiers and DC-DC converters are mandatory to adapt the grid voltage to the application requirements.

The electrical devices used to convert an alternating-current (AC) to a direct-current (DC) are known as rectifiers. So, the AC to DC conversion process is known as rectification. Depending on the rectifier type and the input AC voltage, the output DC voltage can be variable or not. Diode rectifiers make the output DC voltage to be input AC voltage dependent, while active rectifiers maintain the output DC voltage constant.

Rectifiers convert AC side voltages and currents to DC side voltages and currents. Depending on the rectifier type, the DC side voltage can be constant or AC input voltage dependent. In this chapter, different rectifier topologies have been studied. For each converter, analytical expressions for the estimation of the DC bus capacitor and power losses have been presented. The main characteristics of the analyzed converters can be summarized as:

- The three-phase DFE rectifier is a unidirectional, cheap, simple and reliable converter. As this converter does not provide any control over the output voltage, the DC side voltage is dependent on the AC input voltage. Compared to VSC type rectifiers, the AC side current waveform contains more harmonic components, which provoke heating and torque issues to the generators in the AC side.
- Compared with the DFE rectifier, 2L-VSC requires controlled switching devices that increase its complexity. However, the DC bus voltage controllability and the better AC side waveforms quality have become this converter in one of the most used rectifiers in several industrial applications.
- Multilevel converters overtake the 2L-VSC in terms of switch power losses, harmonic distortion, applied voltage derivatives to the AC side generator and common mode voltage. The 3L-NPC has become the preferred multilevel converter demonstrating a reliable and efficient performance. As each leg is composed of four series connected switching devices, the total DC bus voltage can be twice the DC bus voltage of the 2L-VSC. In consequence, this converter is better suited for medium voltage than the 2L-VSC.
- The modular structure of the CHB makes possible the operation of the converter at high voltages and the use of redundant modules leads to high reliability. Its main drawback is the high number of capacitors it requires. Furthermore, as the CHB converter is composed of single-phase HB converters, the second current harmonic component circulating through their DC bus capacitors makes the required DC bus capacitor larger than that required by three-phase converters.

14.2.2 Electronic Soft Starter for 1/3 Phase Induction Motor for Agriculture

An induction motor draws current more than the rated capacity during starting phase which might damage stator windings of three phase induction motor. To avoid the problem of high starting current, voltage is increased gradually from lower to higher level using smooth and soft starters. A smooth and soft starter is employed in a three phase induction motor to eliminate the surge in current and electromagnetic torque during starting. The surge in current and torque are eliminated temporarily using soft started at the time of starting. This in turn reduces the stress applied on an

electric motor and shaft attached with rotor. The soft starter also eliminates the unwanted effects in electric cables and power distribution network. This paper provides a detailed description of soft and smooth start to an induction motor. At the time of starting, an induction motor draws significant amount of current from the supply and this drawn current is higher than the rated current of three phase induction motor. The motor reaches the full rated speed instantaneously as soon as the voltage is applied. The smooth start of three phase induction motor is based on the delay angle of TRIAC circuit. The firing angle is delayed during starting and delay angle reduces as the motor picks up the speed. The firing delay angle is further reduced to zero when motor reaches full speed. This proposed technique provided reduced voltage at the time of starting and full rated voltage when motor reaches full speed. Due to proposed technique, motor starts at a slow speed and gradually increases to full rated speed. By using soft starters, performance of induction motor is improved and it also improves load torque characteristics.

The ac motor starters are increasingly becoming popular due to its controlled soft-starting capability. The ac motor starter provides limited starting current and hence conventional electromagnetic line starters and reduced voltage starters are replaced with ac motor starters. Thyristor-based soft starters have many desirable properties and provide a viable solution to starting problems in three phase induction motors. These power semiconductor based starters are cheap, simple, and reliable and occupies less volume. The power density of these soft starters is also very high. A three phase induction motor produces electromagnetic torque on its shaft but initial switching instants of all three phases to the supply produces pulsations on the electromechanical torque when it is controlled by a direct- online starter. These severe pulsations in electromagnetic torque might cause shocks to the shaft and hence to the driven equipment. These pulsations might damage mechanical system components, such as shafts, couplings and gears etc. The electromagnetic torque pulsations also causes long term effects on various mechanical system components if the strength of materials is exceeded which might lead to fatigue also. The reduced voltage starting by soft starters eliminates stress from the electrical supply and it also reduces the possibility of voltage dip and brown out conditions. Soft and smooth starters provide smooth acceleration of rotor of three phase induction motor. Reduced voltage starting reduces high amount of starting torque applied on the shaft and therefore eliminates the shock on the driven load. An instantaneous high amount of starting torque can cause a jolt on the conveyor which can damage products, pump cavitations and water hammer in pipes. Therefore, a soft starter ramps up the voltage applied to the motor from the initial voltage to the full voltage. The voltage is initially kept low to avoid sudden jerks during the start. The voltage and torque increases gradually so that the induction motor starts to accelerate. This ramp up voltage provides sufficient torque for the load to accelerate gradually and hence mechanical and electrical shocks are minimized from the system, The voltage supplied to stator windings are adjustable and it has ramp characteristics.

A soft starter provides reduced voltage to stator windings of three phase induction motor by controlling the acceleration of an electric motor. A three phase induction motor is a self-starting motor and electromagnetic torque is produced due to an interaction between revolving magnetic field around rotor and rotor current. Initially during starting, a rated voltage is applied which causes high current to flow through stator windings. Now this high current is greater than the rated current which can cause heating of the stator windings and eventually damaging the insulation applied on stator windings. To avoid the problem of high starting current, there is a need of motor starters in an electric motor. The motor can be started in three ways. Firstly by applying full load voltage i.e. direct on line starting. Secondly, by applying voltage gradually using star-delta starter and soft starter. Thirdly, by applying part winding starting i.e. autotransformer starter. A soft starter

provides reduced voltage and hence reduced torque on electric motor. A soft starter comprises of solid state devices like thyristors. The supply voltage to the motor is controlled by power semiconductor devices like thyristors. In a three phase induction motor, the torque is proportional to the square of the starting current which in turn, is proportional to the applied voltage. The starter works on the principle described above. Therefore, the torque and the current can be controlled by applying the reduced voltage at the time of starting of an electric motor. The two types of control are possible using soft starter. The first one is open loop control and second is closed loop control. In an open loop control, a start voltage is applied with time. This start voltage is applied irrespective of the current drawn or the speed of the motor. For each phase, two SCRs are connected in antiparallel direction and SCR are initially started at a delay angle of 180 during respective half wave cycles. Each SCR conducts in each half cycle. This delay is reduced gradually with time when applied voltage reaches to the full supply voltage. The reduced voltage ramps up to the full voltage and simultaneously, the firing angle is reduced from 180 to 0. This type of system is known as time voltage ramp system. This method has a drawback that it cannot control the acceleration of motor. In a closed loop control, any characteristic of the motor is monitored for the desired response. The starting voltage is modified depending on required motor current or motor speed. The current in each phase is monitored properly and time voltage ramp is stopped when current in each phase exceeds a certain set point. The supply voltage applied to stator windings of three phase induction motor is controlled by controlling the conduction angle of SCRs. A soft starter basically comprises of two anti-parallel SCRs in each phase of three phase induction motor. There are total six SCRs required for all three phases for smooth acceleration of electric motor. These SCRs are power semiconductor devices which normally are in OFF state but these SCRs starts to conduct when firing signals are given to them and hence allows voltage and current to pass through them.

An effective and efficient technique has been presented in this paper which provides reduced voltage and reduced current at starting and at the same time, a control in an electromagnetic torque is also obtained. The motor torque is varied according to load torque and acceleration is maintained constant over the entire starting period with the help of this technique. The proposed approach eliminates shaft torque pulsations at the time of starting. The starting current is reduced significantly with the use of soft-starter circuit. The soft starter also eliminates the starting losses in the motor and hence it results in increased life and increased efficiency of an electric motor. It is found that the heating losses are reduced by 50% when soft-starters are employed during starting of three phase induction motor.

14.2.3 Advanced Wireless Power Transfer System

The Transfer of electrical power in reliable and efficient way is always challenging for the designers and engineers. Presently all electrical power from the generating stations to the distribution station is transferred by the uses of wires and underground cables. One of the major issues in these types of systems is the losses due to resistance of the material. Generally the percentage of loss of power during the transmission and distribution is 26%. In modern technology the use of portable device has increased such as mobile robots and electric vehicle. Mobility is the main concern of these equipment i.e. they are not connected to the main source of power. All these problems are the main motivation for researchers. Nikola Tesla was the first who introduce the concept of wireless power transfer. But this technology from the time of Tesla is underdeveloped due to lack of funding and technology .But research from past few years has always going on and recent development has been observed in the field . Wireless power transfer can be achieved by

several methods. Here we discussed few methods such as induction coupling, resonating coupling, LASER technology for electrical power transfer.

- After the immense research in electromagnetic field by many pioneers and development of electromagnetic induction law by Michael Faraday which gives the basis of wireless power transfer.
- In 1891 Nikola Tesla was the first pioneer who started working on wireless power transfer system in his "experimental station" at Colorado, by using Tesla coils.
- Tesla want to develop a wireless power system that is capable of transmitting power over long distances. He proposed many such systems.
- Nikola Tesla successfully lighted a small incandescent lamp by means of a resonant circuit grounded on one end. The lamp is lighted by the current induced in the coil.
- Wardenclyffe tower was also designed by Tesla for Trans-Atlantic wireless telephone and also for demonstrating wireless electrical power transmission.
- In 2008 the wireless power consortium was established to connect all manufactures its Qi inductive power standard enable wireless power charging and powering of portable devices of capacity up to 5W with separation distance 4cm.
- In recent years the research on microwave and LASER wireless power transmission system such as solar power satellite has increased.
- Energy harvesting also called power harvesting which is the conversion of ambient energy from environment to electric power which mainly used to power mini watts wireless electronic devices .The ambient energy is produce from stray electric or magnetic field or radio waves.

Inductive Coupling

This type of WPT is simply based on inductive coupling between two coils. This is a type of near field technique measuring with appliance near the source. It is generally based on the principle of mutual induction, where two coils are placed vicinity to each other and there is no physical connection between these two coils. The simplest example is transformer where the transfer of energy takes place due to electromagnetic coupling. Each of these coils connected without wires and it has been an important and popular technology to transfer power without wires because of its simplicity and reliability. Based on this technology there are various application device has been already made including electric brush and charging pad for cell phones or laptop. But this kind of method also have some limitation i.e. the range can be very less upto few cm and separation distance is very less than the coil diameter.

Magnetic Resonance Coupling WPT

This is also one of the important method for transferring power based on near field technique. It generally overcome the disadvantage of up to some extent which arise in non-resonant inductive coupling. This type of coupling used the concept of resonance. At resonance we know that natural frequency and excitation frequency are same. This leads to the maximum amplitude that means a maximum amount of energy is transferred between two coils. Here the receiver and transmitter coils are tuned to be at same resonant frequency .This allow us to transfer significant amount of power by increasing distance between coils. These type of system are used for building mid-range power transfer. Mid-range can be specified by distance upto 10 times the diameter of the transmitting coil. Magnetic resonance coupling have several advantage such as efficiency increases with decrease in the radiation and power loss and range can be increase upto some meter

and it is directional. The mainly disadvantage is that selection of resonance frequency which tunes with the natural frequency and it cannot be used for long range application.

Microwave WPT

This is one of the type of far-field technique of WPT which have range up to KM, with power transfer up to MW. This method uses microwave frequency ranging from 1GHZ to 1000GHZ generated from the microwave generator. First the microwave is generated by microwave generator which pass through the coax-waveguide adapter to the waveguide circulator .Then a tuner and directional coupler are used to separate wave according to their propagation direction. Then they are transmitted through antenna. At the receiver terminal, a receiver antenna receives which pass through a low pass filter to finally produce DC power. Based on microwave WPT system the present application is solar power satellite. Advantages of microwave WPT are that it is used for several KM range with transferring high amount of power. Disadvantage are generally that the radiation effect to human beings from the microwave electromagnetic radiation.

Laser WPT

This is also one of the types of far- field technique, where the power is transmitted through LASER beams. For power transmission firstly the electrical energy is converted to high LASER beams and at receiving side, these LASER beams are converted to electricity by using photo voltaic cells. This type of WPT has several disadvantage i.e. why it is not used for electrical power transmission because LASER beams can easily harms human being if they cut LASER beam path. Therefore these are generally used for military weapon development and space research.

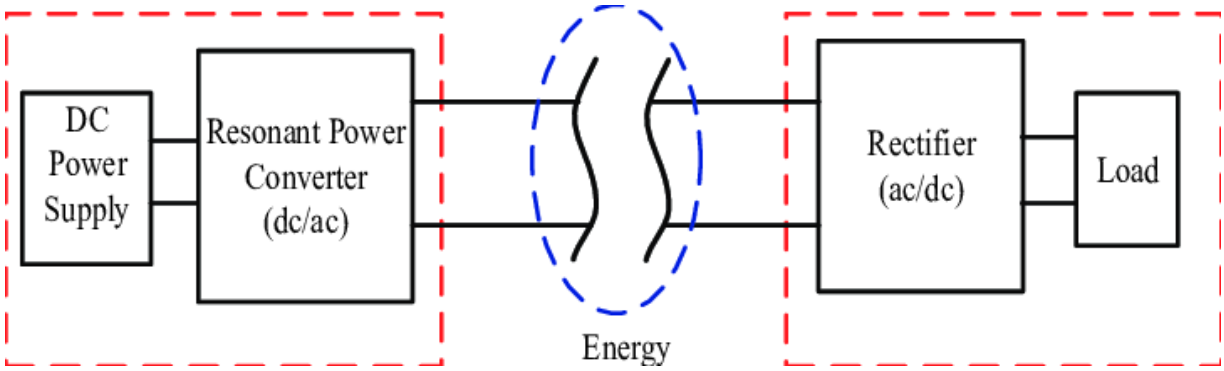


Fig. – 98 Block Diagram of WPT System

14.2.4 Industrial Temperature Controller

As the name implies, a temperature controller is an instrument used to control temperatures, mainly without extensive operator involvement. A controller in a temperature control system will accept a temperature sensor such as a thermocouple or RTD as input and compare the actual temperature to the desired control temperature, or set point. It will then provide an output to a control element.

A good example would be an application where the controller takes an input from a temperature sensor and has an output that is connected to a control element such as a heater or fan. The

controller is usually just one part of a temperature control system, and the whole system should be analyzed and considered in selecting the proper controller.

There are three basic types of process controllers: on-off, proportional and PID. Depending upon the system to be controlled, the operator will be able to use one type or another to control the process.

On/Off temperature Controller

An on-off temperature controller is the simplest form of control device. The output from the device is either on or off, with no middle state. An on-off controller will switch the output only when the temperature crosses the set point. For heating control, the output is on when the temperature is below the set point, and off above set point.

Since the temperature crosses the set point to change the output state, the process temperature will be cycling continually, going from below set point to above, and back below. In cases where this cycling occurs rapidly, and to prevent damage to contactors and valves, an on-off differential, or "hysteresis," is added to the controller operations.

This differential requires that the temperature exceed set point by a certain amount before the output will turn off or on again. On-off differential prevents the output from "chattering" or making fast, continual switches if the cycling above and below the set point occurs very rapidly. On-off control is usually used where a precise control is not necessary, in systems which cannot handle having the energy turned on and off frequently, where the mass of the system is so great that temperatures change extremely slowly, or for a temperature alarm. One special type of on-off control used for alarm is a limit controller. This controller uses a latching relay, which must be manually reset, and is used to shut down a process when a certain temperature is reached.

Proportional Control

Proportional controls are designed to eliminate the cycling associated with on-off control. A proportional controller decreases the average power supplied to the heater as the temperature approaches set point.

This has the effect of slowing down the heater so that it will not overshoot the set point, but will approach the set point and maintain a stable temperature. This proportioning action can be accomplished by turning the output on and off for short time intervals. This "time proportioning" varies the ratio of "on" time to "off" time to control the temperature. The proportioning action occurs within a "proportional band" around the set point temperature.

Outside this band, the temperature controller functions as an on-off unit, with the output either fully on (below the band) or fully off (above the band). However, within the band, the output is turned on and off in the ratio of the measurement difference from the set point. At the set point (the midpoint of the proportional band), the output on: off ratio is 1:1; that is, the on-time and off-time are equal. If the temperature is further from the set point, the on- and off-times vary in proportion to the temperature difference. If the temperature is below set point, the output will be on longer; if the temperature is too high, the output will be off longer.

PID Control

The third controller type provides proportional with integral and derivative control, or PID. This controller combines proportional control with two additional adjustments, which helps the unit automatically compensate for changes in the system.

These adjustments, integral and derivative, are expressed in time-based units; they are also referred to by their reciprocals, RESET and RATE, respectively. The proportional, integral and derivative terms must be individually adjusted or "tuned" to a particular system using trial and error. It provides the most accurate and stable control of the three controller types, and is best used in systems which have a relatively small mass, those which react quickly to changes in the energy added to the process.

Standard Sizes

Since temperature controllers are generally mounted inside an instrument panel, the panel must be cut to accommodate the temperature controller. In order to provide interchangeability between temperature controllers, most temperature controllers are designed to standard DIN sizes. The controller is one part of the entire control system, and the whole system should be analyzed in selecting the proper controller. The following items should be considered when selecting a controller-

- Type of input sensor (thermocouple, RTD) and temperature range.
- Type of output required (electromechanical relay, SSR, analog output)
- Control algorithm needed (on/off, proportional, PID)
- Number and type of outputs (heat, cool, alarm, limit)

14.2.5 Accident Alerts in Modern Traffic Signal Control System-Camera Surveillance System

Road accidents and traffic congestion are the major problems in urban areas. Currently there is no technology for accident detection. Also due to the delay in reaching of the ambulance to the accident location and the traffic congestion in between accident location and hospital increases the chances of the death of victim. There is a need of introducing a system to reduce the loss of life due to accidents and the time taken by the ambulance to reach the hospital. To overcome the drawback of existing system we will implement the new system in which there is an automatic detection of accident through sensors provided in the vehicle. A main server unit houses the database of all hospitals in the city. A GPS and GSM module in the concerned vehicle will send the location of the accident to the main server which will rush an ambulance from a nearest hospital to the accident spot. Along with this there would be control of traffic light signals in the path of the ambulance using RF communication. This will minimize the time of ambulance to reach the hospital. A patient monitoring system in the ambulance will send the vital parameters of the patient to the concerned hospital. This system is fully automated, thus it finds the accident spot, controls the traffic lights, helping to reach the hospital in time.

Automatic Incident Detection (AID) system, provides a new technical means for the highway intelligent traffic management, improves the efficiency and reduces the work intensity of the highway management department. This paper takes the French Citlog video traffic incident automatic detection system for the technical background, introduces the principle, functions, technical characteristics and the preliminary project implementation plan of automatic detection system. In present days the rate of accidents can be increased rapidly. Due to employment the usage of vehicles like cars, bikes can be increased, because of this reason the accidents can be happened due to over speed. People are going under risk because of their over speed, due to unavailability of advanced techniques, the rate of accidents can’t be decreased. To reduce the accident rate in the country this paper introduces an optimum solution. Automatic alert system for vehicle accidents is introduced.

15. SMART AND/OR SUSTAINABLE FEATURES OF CHAPTER 8 & 13 DESIGNS, IMPACT ON SOCIETY.

(For allocated village development, villager's happiness, comfortable and for enhancement of the village) with doing small changes, period, amount expenditure and benefit – a) Immediately b) within 1 year c) long term (3-5 years) along with cost estimation.

Table – 40 Design Period And Expenditure (Civil)

Sr. no.	Design name	Period (month, year)	Amount Expenditure (Rs.)
1	Low Cost Toilet	Immediately	6,766
2	Reconstruction Of Anganwadi	Immediately	97,936
3	Health Centre	Immediately	2,67,067
4	Furrow Irrigation System	Within 2 years	Approx. 13,2010
5	Rectangular Overhead Water Tank	Within 1 year	7,02,657
6	Biogas Plant	Within 1 year	Initial 10,000 to 20,000
7	Reconstruction Of Panchayat Building	Immediately	6,11,793
8	General Market	Immediately	4,51,103
9	Reconstruction Of The Milk Dairy	Immediately	3,08,201
10	Bus Stand	Within 8 months	1,26,692
11	Computer Classes With Cyber Café	Within 1 year	1,70,564
12	Agriculture Co-Operative Society	Within 1 year	2,94,916

Table – 41 Design Period And Expenditure (Electrical)

Sr. no.	Design name	Expenditure amount (Rs.)
1	Smart power theft detection system	5,500
2	Short circuit protection	-
3	Vertical axis wind turbine	5 kw-1,70,000 & 10 kw-2,50,000
4	Automated solar gas cutter	7000 to 8000
5	Smart street light	2000 to 2500
6	LPG leakage detector	917

Chapter 16. Survey by Interviewing With Talati And/Or Sarpanch

Gujarat Technological University, Ahmedabad, Gujarat

Vishwakarma Yojana: Phase VIII
Survey with Interviewing

SURVEY BY INTERVIEWING WITH TALATI AND/OR SARPANCH

Vishwakarma Yojana: Phase VIII

ALLOCATED VILLAGE SURVEY

An approach towards "Rurbanisation for Village Development"

CHAPTER- 16

Sr.	Questions	Yes/No	Remarks
1	What are the sources of income in village?	Yes	Agro Products, Cattel Farming.
2	What are the chances of employment in village?	NO.	
3	What are the special technical facilities in village?	–	
4	Is any debt on village dwellers?	–	
5	Are village people getting agricultural help?	Yes	
6	Is women health awareness Program organized in village?	No	
7	Are women having opportunity to work and income?	Yes.	
8	Child girl education is appreciated in village?	Yes.	
9	Facility of vaccination to child is available in village?	No	No Paeticular Build.
10	Are village people aware about child vaccination and done to each and every child as per norms?	Yes	Under Private & crow. Sanstha.
11	Women help line number information is provided to village people?	Yes	National
12	Is water scarcity in village? How many days per year?	NO	Full supply of Water.
13	Is village under any debt?	No	
14	Is any serious issue due to debt from bank or any person happened in village?	–	
15	Is any suicide like incident observed in village due to government policy, debt or threatening?	–	
16	Is any death of patient occurred due to unavailability of medical facility in village?	–	There is no medical facility in village within.
17	How many disabled (physically challenged) is observed in village? Provide list with Male/female/girl/boy with age and type of disability and reason of disability.	No	No disable
18	Is village improvement is observed in comparative scenario from past to present?	Yes	Houses are well developed & other facility.
19	Is any unavoidable difficulty village people are facing? Any natural calamity is there?	NO.	
20	Life Living standard of girls and women is appreciated and uplifted in village?	Yes.	But needed Some Improvement.

Administration queries/ Difficulties:
GTU VY Section
Contact No – 079-23267588
Email ID: rurban@gtu.edu.in

CHAPTER 17. IRRIGATION / AGRICULTURE ACTIVITES AND AGRO INDUSTRY, ALTERNATE TECHNICS AND SOLUTION

The main occupation of the village is agriculture, they mainly grow rice, sugarcane. Approximately 70-80% of the village is engage in this activities. They are using their own cultivable techniques which were use primitively by their forefathers; but as the time passes they adopt the new technologies and equipment for the cultivation. Ploughing, sowing, watering etc. is same as primitively, but the harvesting and growing techniques are modern. Machines like tractor, etc. are used and for ploughing bullock is used.

For watering; provision the canal is there so they directly used that water by pumping or used bore water for cultivation. So the furrow irrigation is proposed for the better used of water and no wastage of it, and it is suggested as per the favourable to crop grown. As the land is fertile, black soil, flat surface, and more yield of crop it is adopted.

Fig. – 99 Watering the Crop (Farm)

Here some detail regarding the new technologies and their adoption is explain below:

Types of agricultural technology

- Agricultural drone
- Satellite photography and sensors
- IoT-based sensor networks
- Phase tracking
- Weather forecasts
- Automated irrigation
- Light and heat control
- Intelligent software analysis for pest and disease prediction, soil management and other involved analytical tasks
- Biotech
- Hydroponics, soilless farming technology
- Soil moisture sensors

Among other technologies, farmers have picked five they deem to be the best:

- GIS software and GPS agriculture
- Satellite imagery
- Drone and other aerial imagery
- Farming software and online data
- Merging datasets

As a result, modern farms get significant benefits from the ever-evolving digital agriculture. These benefits include reduced consumption of water, nutrients, and fertilizer, reduced negative impact on the surrounding ecosystem, reduced chemical runoff into local groundwater and rivers, better efficiency, reduced prices, and many more. Thereby, business becomes cost-effective, smart, and sustainable.

Agricultural drone

In future aerial drone technology is used for the farm efficiency and replace the irrigation system in the village. The aerial view provided by a drone can reveal many issues such as irrigation problems, soil variation, and pest and fungal infestations. Multispectral images show a near-infrared view as well as a visual spectrum view. The combination shows the farmer the differences between healthy and unhealthy plants, a difference not always clearly visible to the human eye. Thus, these views can assist in assessing crop growth and production. Crops can be surveyed at any time using agricultural drones, allowing for rapid identification of problems.

Fig. – 100 Spec Drone

Specs drone

- Irrigation management drones
- Irrigation management drones assist with crop
- Development
- Analysing the field
- Mapping large areas of land
- Thermodynamic imaging
- Applying fixes and finding problems

CHAPTER 18 SOCIAL ACTIVITIES – ANY ACTIVATES PLANNED BY STUDENTS

According to the government guidelines for covid-19, it is not possible to do social activities in the village because it is forbidden to stay at home, not to gather, and to maintain social distance. Because the villagers are also following the guidelines, and the number of cases is increasing, social activities such as gathering and discussion, as well as camping, are avoided. Instead, we did a small project in which we distributed jute cloth bags and sanitizer bottles to students at the school. As pollution rises and recycling plastic bags becomes impossible, the use of paper and jute cloth bags for carrying items is explained in order to reduce the use of plastic bags. Also, make the villagers aware of the importance of using a jute cloth bag and sanitizer. Aside from that, we have shared a portion of our knowledge on how to use a dustbin or to composite raw garbage and different types of garbage in different bins, using the mobile as a medium. It is not possible to guide the entire village, so wherever we find waste and plastic thrown here and there in that part of the village or where people surround us, make them awareness and explain them about its effects, causes, and alternatives. Because it took time and we needed to respect people's time, our group of three was divided into three directions in the village.

Aware about the use of jute cloth and paper bag instead of plastic and use of sanitizer in these pandemic situation.

Fig. – 101 Jute Bag And Sanitizer Distribution

Explain how to use garbage as fertilizer and other type of garbage to dispose in the bins as per the color decided by the government to collect it.

Fig. – 102 How to Segregate Garbage

Some picture of the part of village which are pulling down the standard and cleanliness of the village.

Fig. – 103 Waste Seen In Village

Maintain the social distancing.

Fig. – 104 Communicating

19. <<KUNKNI VILLAGE>> SAGY QUESTIONNAIRE SURVEY FORM WITH THE SARPANCH SIGNATURE

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

Village: Kunkni Gram Panchayat: Kunkni Ward No. –

Block: Olpad District: Surat

State: Gujarat L S Constituency: Surat

1. Family Identity and Size

Name of Head of Household	Chaganbhai Patel							Male/ Female	5M /3F
SECC Survey ID:		Family Size	8	Over 18	5	6 to 18	3	Under 6	

2. Category & Entitlement Details (Tick as appropriate)

Social Category[1]	OBC	Life Insurance	1. All Adults ✓ 2. Some Adults 3. None	AABY	1. Yes 2. ~~No~~	Kisan Credit Card	Yes / ~~No~~
Poverty Status Year[2]:	1. BPL 2. ✓ APL	Health Insurance	1. All Adults ✓ 2. Some Adults 3. None	RSBY	1. Yes 2. ~~No~~	MGNREGS Job Card Number	NO
PDS (If NFSA is not implemented)	Annapurna	Antyodaya	BPL	~~APL~~ ✓	Is any woman in the family member of an SHG? ~~Yes~~ / No		
PDS (If NFSA is implemented)	Annapurna	Antyodaya	Priority	Other			

2. Adults (above 18 years)

Name	Age	Sex M/F/O	Disability Status Y/N	Marital Status[3]	Education Status[4]	Adhaar Card (Y/N)	Bank A/C (Y/N)	Social Security Pension[5]
Chaganbhai Patel	81	M	NO	Yes	8th	Yes	Yes	No
Sardaben Patel	50	F	No	Yes	7th	Yes	Yes	No
Ritaben Patel	30	F	NO	Yes	12th	Yes	Yes	NO
Jigneshbhai Patel	35	M	No	Yes	12th	Yes	Yes	Yes

3. Children from 6 years and up to 18 years

Name	Age	Sex M/F/O	Disability Y/N	Marital Code*	Level of Education: Code#	Going to School /College (Y/N)	Current Class	Computer Literate Y/N
Preet Patel	12				6th	School	6th	Yes
Tegil Patel	6				1st	School	1st	NO.

4. Children below 6 years

Name	Age	Sex M/F/O	Disability Yes/No	Going to School (Y/N)	Going to AWC Y/N	De-worming Done	Fully Immu-nised Y/N	Mother's Age at the time of Child's Birth

[1] Scheduled Caste 1, Scheduled Tribe 2, Other Backward Castes 3, Other 4

[2] Enter the BPL Survey round being used in the Gram Panchayat for identification of BPL Families (e.g. 1997/2002/2011)

[3] *Marital Status: Not Married – 1, Married – 2, Widowed – 3, Divorced/Separated – 4*

[4] *Level of Education: Not Literate – 01, Literate – 02, Completed Class 5 - 03, Class 8th – 04, Class 10th-05, Class 12th-06, ITI Diploma-07, Graduate-08, Post Graduate/Professional – 09 (write the highest level applicable)*

[5] No Pension – 0, Old Age Pension – 1, Widow Pension – 2, Disability Pension – 3, Other Pension – 4 (mention)

SAANSAD ADARSH GRAM YOJANA (SAGY) Baseline Household Survey Questionnaire

5. Hand washing

	Always		Sometimes		Never
After use of Toilet	Soap ✓	Other	Soap	Other	—
Before Eating	Soap ✓	Other	Soap	Other	—

6. Use of Mosquito Net
Children: ~~Yes~~ / No Adults: ~~Yes~~ / No

7. Do members take Regular Physical Exercise

	Yoga	Games	Other Exercises
Adults	Yes / ~~No~~	~~Yes~~ / No	Yes / ~~No~~
Children	Yes / ~~No~~	~~Yes~~ / No	Yes / ~~No~~

8. Consumption of Tobacco

	Smoking	Chewing
Adults	✓	✓
Children	✗	✗

9. House & Homestead Data

Own House: ~~Yes~~ / No	No. of Rooms:
Type: Kutcha / Semi Pucca / ~~Pucca~~	
Toilet: ~~Private~~ / Community / Open Defecation	
Drainage linked to House: ~~Covered~~ / Open / None	
Waste Collection System	Door Step / Common Point / ~~No Collection System~~
Homestead Land: Yes / ~~No~~	Kitchen Garden : Yes / ~~No~~
Compost Pit: Individual/ Group/ ~~None~~	Biogas Plant: Individual/ Group/ ~~None~~

10. Source of Water (Distance from source in KMs)

Source of Water		Distance
Piped Water at Home	~~Yes~~ / No	
Community Water Tap	Yes / ~~No~~	
Hand Pump (Public / Private)	~~Yes~~ / No	Not use
Open Well(Public / Private)	~~Yes~~ / No	Not use
Other (mention):		

11. Source of Lighting and Power

Electricity Connection to Household: ~~Yes~~ / No
Lighting: ~~Electricity~~/Kerosene/Solar Power
Mention if Any Other: Solar Power - Personal
Cooking: ~~LPG~~/Biogas/Kerosene/~~Wood~~/Electricity
Mention if Any Other: _____
If cooking in Chullah: ~~Normal~~/ Smokeless

12. Landholding (Acres)

1. Total		2. Cultivable Area	—
3. Irrigated Area	19.96	4. Uncultivable Area	—

13. Principal Occupations in the Household

Livelihood	Tick if applicable
Farming on own Land	✓
Sharecropping /Farming Leased Land	✗
Animal Husbandry	✓
Pisciculture	✗
Fishing	✗
Skilled Wage Worker	✗
Unskilled Wage Worker	✗
Salaried Employment in Government	✓
Salaried Employment - Private Sector	✓
Weaving	✗
Other Artisan(mention)	
Other Trade & Business (mention)	

14. Migration Status
Does any member of the household migrate for Work: Yes ~~/ No~~. If Yes Entire Year ~~/ Seasonal~~
Does anyone below 18 years migrate for work: Y/~~N~~

15. Agriculture Inputs

Do you use Chemical Fertilisers	~~Yes~~/No
Do you use Chemical Insecticides	Yes/~~No~~
Do you use Chemical Weedicide	Yes/~~No~~
Do you have Soil Health Card	Yes/No
Irrigation: None/ ~~Canal~~/ Tank/ Borewell/Other	
Drip or Sprinkler Irrigation: Drip /Sprinkler / ~~None~~	

16. Agricultural Produce in a normal year (Top 3)

Name	Unit	Quantity
Rice		kg
Sugarcane		kg
Vegetables		kg

17. Livestock Numbers

Cows: ____	Bullocks: ____	Calves: ____
Female Buffalo: ____	Male Buffalo: ____	Buffalo Calves: ____
Goats/ Sheep: NO	Poultry/ Ducks: NO	Pigs: NO
Any other: Type NO		No. —
Shelter for Livestock: Pucca / ~~Kutcha~~ / None		
Average Daily Production of Milk(Litres): ____		

18. What games do Children Play
Volley ball
Cricket

19. Do children play musical instrument (mention)
NO

Schedule Filled By:
Principal Respondent:
Date of Survey:

3

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

I. Basic Information

a. Gram Panchayat: Kunkni

b. Block: Olpad

c. District: Surat

d. State: Gujarat

e. Lok Sabha Constituency: Surat Parliamentary Constituency

f. Number of Wards in the Gram Panchayat: _____

g. Number of Villages in the Gram Panchayat: 1

h. Names of Villages:

Kunkni

Demographic Information (2011)

Number of Households 169 Total Population 856 Male 438 Female 418

SC HHs _____ ST HHs _____ OBC HHs _____ Other HHs _____

I. Access to Infrastructure / Facilities / Services

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
a.	ANM/ Health Sub Centre	N	
b.	Nearest Primary Health Centre (PHC)	Y	4-5 km
c.	Nearest Community Health Centre (CHC)	N	
d.	Nearest Post Office	Y	10 km
e.	Nearest Bank Branch (Any)	Y	4-5 km
f.	Nearest Bank with CBS Facility	N	
g.	Nearest ATM	N	
h.	Nearest Primary School	Y	0 km (Govt)
i.	Nearest Middle School	Y	2 km (Private)
j.	Nearest Secondary School	Y	2 km (Private)
k.	Nearest Higher Secondary School / +2 College	Y	2 km (Private)
l.	Nearest Graduate College	N	
m	Nearest ITI / Polytechnic Centre	N	
n	Kisan Seva Kendra	N	

1

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

	Infrastructure Facilities / Services	Located within the GP Yes (Y)/No (N)	If located elsewhere (N), distance from the GP office
o	Agriculture Credit Cooperative Society	NO	
p	Nearest Agro Service Centre	NO	
p	MSP based Government Procurement Centre	NO	
q	Milk Cooperative /Collection Centre	Yes	0 km (within village)
r	Veterinary Care Centre	NO	
s	Ayurveda Centre	NO	
t	E – Seva Kendra	NO	
u	Bus Stop	Yes	4 km
v	Railway Station	Yes	23 km (Surat)
w	Library	NO	
x	Common Service Centre	NO	

IV. Sports Facilities in the Gram Panchayat

a. Number of Play Grounds in the GP: Total 1 Public _____ Private _____

b. Mini Stadium : NO Yes(Y) /No (N) *(Playground with equipment and sitting arrangement)*

V. Education, ICDS

a. Number of Angan Wadi Centres: 1

b. Number of villages without Angan Wadi Centres 0

Names of such villages: Kunkni

c. Schools (Number)

Primary Private: NO Primary Govt.: Yes

Middle Private: Yes Middle Govt.: Yes

Secondary Private: Yes Secondary Govt.: NO

Higher Secondary Private: Yes Higher Secondary Govt: NO

VI. Public Distribution System

	Item	Private Contractor	Women's SHG	Gram Panchayat	Cooperative	Other (Mention)	Location in GP (mention Location)	If outside GP, Location & distance from GP HQrs)
a.	Cereal (Rice/ Wheat/ Millets)	+ Sugarcane						
b.	Kerosene							
c.	Other (mention) LPG (Cylinder)							

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

VII. Coverage of Villages under different Facilities & Services

	Parameter	Villages Status[1]	Names of Villages Covered	Names of Villages not Covered
a.	Piped Water Supply Coverage to Villages	Covered 100% Not Covered	(Kunkni)	
b.	Hand Pump Coverage in Villages:	Covered Not Covered Open	Total 5 Hand Pumps are there. But no in use. (Kunkni)	
c.	Coverage under Covered Drains:	Covered 50-50% Not Covered	(Kunkni)	
d.	Coverage under Open Drains:	Covered 50-50% Not Covered	Waste Water is released directly into Waterbodies (Kunkni)	
e.	Villages with Household Electricity Connection (Numbers)	Connected 100% Not Connected	GEB. Kunkni)	

VIII. Land and Irrigation

	Private Land	Area in Acres		Common Land	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	191.9hac	d.	Pasture / Grazing Land		g.	Check Dam	
b.	Irrigated Land	191.9ha	e.	Forests/ Plantations		h.	Wells/Bore Wells	2
c.	Un-irrigated Land	–	f.	Other Common Land		i	Tanks /Ponds Lake	1 2

[1] Mention the number of Villages Covered and Not Covered

Saansad Adarsh Gram Yojana (SAGY) Panchayat Details Survey Questionnaire

(Note: Please aggregate information from village level questionnaires wherever relevant)

IX. Parameters relating to Households & Institutions

		Number
a)	Number of eligible Households for pension (old age, widow, disability)	50
b)	Number of Households receiving pension (old age, widow, disability)	50
c)	Number of eligible Households who are not receiving pension	-
d)	Number of Households eligible for Ration Card	All
e)	Number of eligible HHs having ration cards	All
f)	Number of households covered under RSBY (Rashtriya Swasthya Bima Yojana)	25%
g)	Number of HHs covered under AABY (Aam Aadmi Bima Yojana)	0
h)	Number of active Job Card holders under MGNREGA	0
i)	Number of Job Card holders who completed 100 days of work during 2013-14	0
j)	Number of shops selling alcohol	2
k)	Number of BPL families	-
l)	Number of landless households	10
m)	Number of IAY beneficiaries (Indira Awas Yojana) / PMAY	50done
n)	Number of FRA[2] beneficiaries	-
o)	Number of Community Sanitary Complexes	0
p)	Number of Households headed by single women	12
q)	Number of Households headed by physically handicapped persons	-
r)	Total number of Persons with Disability in the village	-
s)	Number of SHGs	0
t)	Number of active SHGs	0
u)	Number of SHG Federations	0
v)	Number of Youth Clubs	0
w)	Number of Bharat Nirman Volunteers / (MPV-)	0

Name and Signature of Surveyor and Respondent'

Surveyor	PRI Respondent (Preferably Gram Panchayat Chairperson)	Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey
Patel Divya Maru Vishal Bavaliya Vinay			

[2] The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

This questionnaire should be filled for each of the villages in the selected Gram Panchayat[1]

I. Basic Information

a. Village: Kunkni

b. Ward Number: -

c. Gram Panchayat: Kunkni

d. Block: Olpad

e. District: Surat

f. State: Gujarat

g. Lok Sabha Constituency: Surat

h. Number of Habitations / Hamlets in the Gram Panchayat: -

i. Names of Habitations / Hamlets:
Kunkni

Demographic Information

Number of Households 169 Total Population 656 Male 438 Female 418

SC HHs _____ ST HHs _____ OBC HHs _____ Other HHs _____

II. Access to Infrastructure/Amenities etc.

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
a.	Nearest Primary School	Yes	Govt + Private 2.5 km
b.	Nearest Middle School	Yes	Govt + Private 2.5 km
c.	Nearest Secondary School	Yes	Private 2.5 km
d.	Kisan Seva Kendra	NO	
e.	Milk Cooperative /Collection Centre	Yes	Within village
g.	Health Sub Centre	NO	
h.	Bank	Yes	Within 10 km
i.	ATM	NO	
j.	Bus Stop	NO	10 km far
k.	Railway Station	Y	23 km far

[1] While filling this the surveyor must collect the information from the Ward Member/s and relevant government officials

1

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

i.	Access to Infrastructure / Facilities / Services	Located in the Village Yes (Y)/No(N)	If located elsewhere (N), distance in kms from the village
l	Library	NO	
m	Common Service Centre	NO	
n	Veterinary Care Centre	NO	

ii. Road Connectivity

a. Habitations connected by All-weather Roads *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations where not available:_____

iii. Drinking Water Facilities

a.Piped Water Supply Coverage to Habitations:_____ *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

b.Hand Pump Coverage in Habitations: _____ *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

iv. Coverage of Habitations under Waste Management System

a. Coverage under Covered Drains: _____*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

b. Coverage under Open Drains: _____*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: Main drainage pipeline not covered

c. Coverage under Doorstep Waste Collection: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

v. Coverage of Habitations under Electrification

a. Coverage under Household Connections: *(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered:_____

b.Coverage under Street Lighting: All*(1-All 2-None 3-Some)*

If 3 mention the name of the habitations not covered: Most of the area only 3-4 available

vi. Sports Facilities in the Village

a.Number of Play Grounds in the Village (minimum size 200 square meters): No

b.Mini Stadium : No Yes(Y) /No (N)

vii. Education, ICDS

a. Number of Anganwadi Centres: 1

c. Schools (Number)

Primary Private: ____ Primary Govt.: 1

Middle Private:_____ Middle Govt.: 1

Secondary Private:_____ Secondary Govt.:_____

Higher Secondary Private: _____ Higher Secondary Govt: _____

2

SAANSAD ADARSH GRAM YOJANA (SAGY) Village Details Survey Questionnaire

viii. Land Category		Area in Acres		Land Category	Area in Acres		Irrigation Structure	No.
a.	Cultivable Land	700000	d.	Pasture / Grazing Land		g.	Check Dam	
b.	Irrigated Land	200000	e.	Forests/ Plnatations		h.	Wells/Bore Wells	
c.	Un-irrigated Land		f.	Other Common Land		I	Tanks /Ponds	

ix. Entitlement Related Parameters		
1	Number of active Job Card holders under MGNREGA	—
2	Number of active Job Card holders who have completed 100 days of work	—
3	Number of shops selling alcohol	—
4	Number of BPL families	2-3
5	Number of landless households	—
6	Number of IAY beneficiaries / PMAY	— / 50 done
7	Number of FRA beneficiaries	—
8	Number of common sanitation complexes	—
9	Number of SHGs	—
10	Number of active SHGs	—
11	Existence of SHG Federation in the Village (Yes / No)	—
12	Number of Youth Clubs	—
13	Number of Bharat Nirman Volunteers	—

Name and Signature of Surveyor and Respondent'

Divija Patel Vishal Maru Vinay Savaliya. Surveyor	PRI Respondent (Preferably a ward member from a ward that is fully or partially covered under the Village)	શાસ્ત્રી જોષીપરા સરપંચ શ્રી ગ્રામ પંચાયત કુકણી તા. ઓલપાડ જી. સુરત Official Respondent (Preferably seniormost Government official in the Gram Panchayat)	Date of Survey

CHAPTER 20. TDO-DDO-COLLECTOR EMAIL SENDING SOFT COPY ATTACHMENT IN THE REPORT

6/12/2021 Gmail - Development of Kunkni Village, Olpad, Surat.

Gmail

PATEL DIVYA <divyapatel3800@gmail.com>

Development of Kunkni Village, Olpad, Surat.

PATEL DIVYA <divyapatel3800@gmail.com> Sat, Jun 12, 2021 at 10:27 AM
To: tdoolpad@gmail.com, ddo-sur@gujarat.gov.in, sdm-olpad-sur@gujarat.gov.in, collector-sur@gujarat.gov.in, mam-olpad@gujarat.gov.in
Cc: Vishwakarma Yojana <rurban@gtu.edu.in>

Respected Sir/Madam,

We are students of C.K. Pithawala College of Engineering and Technology, Dumas, Surat affiliated to Gujarat Technological University-GTU. GTU has been assigned to Vishwakarma Yojana - VY in which students survey various villages and design various amenities to deliver it to them making them ideal for living a better life as per requirements & village problem statements.
As a part of Vishwakarma Yojana's guidelines, we have been asked to inform all the respected officers about our project in which we will shortly notify about Kunkni Village profile of issues for development and our design work for them.

Sr. no.	Design name	Period (month, year)	Amount Expenditure (Rs.)
1	Low Cost Toilet	Immediately	6,766
2	Reconstruction Of Anganwadi	Immediately	97,936
3	Health Centre	Immediately	2,67,067
4	Furrow Irrigation System	Within 2 years	Approx. 13,2010
5	Rectangular Overhead Water Tank	Within 1 year	7,02,657
6	Biogas Plant	Within 1 year	Initial 10,000 to 20,000
7	Reconstruction Of Panchayat Building	Immediately	6,11,793
8	General Market	Immediately	4,51,103
9	Reconstruction Of The Milk Dairy	Immediately	3,08,201
10	Bus Stand	Within 8 months	1,26,692
11	Computer Classes With Cyber Café	Within 1 year	1,70,564
12	Agriculture Co-Operative Society	Within 1 year	2,94,916

Sr. no.	Design name	Expenditure amount (Rs.)
1	Smart power theft detection system	5,500
2	Short circuit protection	-
3	Vertical axis wind turbine	5 kw-1,70,000 & 10 kw-2,50,000
4	Automated solar gas cutter	7000 to 8000
5	Smart street light	2000 to 2500
6	LPG leakage detector	917

Please find herewith attached,
Detailed Project Report Of Kunkni Village.

Best Regards,
Patel Divya D. , Maru Vishal M. , Savaliya Vinay R.
Civil Engineering
C.K. Pithawala College of Engineering and Technology, Dumas, Surat.
Gujarat Technological University
Mail: vishalmaru25134@gmail.com
Mail: vinaysavaliya037@gmail.com

Kunkni Report.pdf
11285K

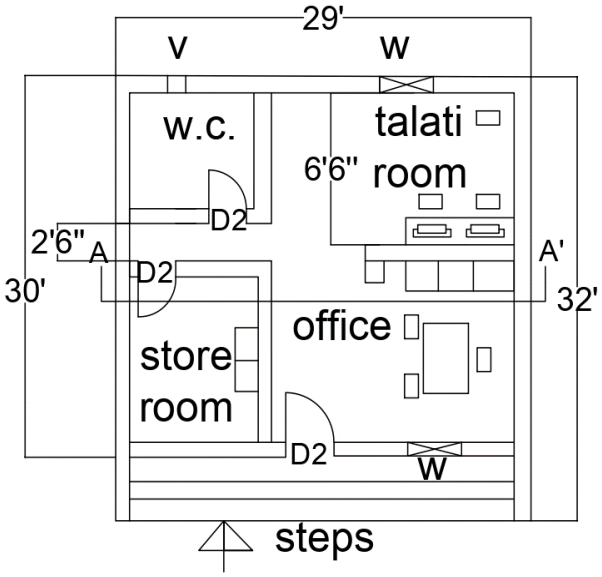
CHAPTER 21. COMPREHENSIVE REPORT FOR THE ENTIRE VILLAGE

CONCEPT

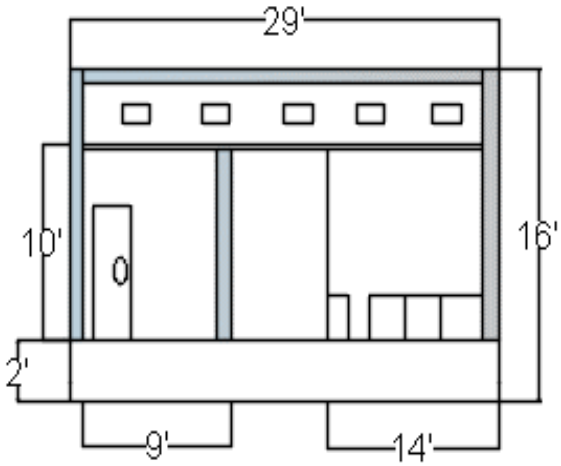
Vishwakarma Yojana is provides special scheme for development of village by GTU and Government of Gujarat in which students work together and collect data and information regards village development with the help of gram panchayat and stake holders. Village have some basic facilities likes drinking water, drainage system, pucca road, and other facilities like primary school, community hall, are sufficient so that village can develop. So, we will give proposal regarding sustainable energy sources and solution related to infrastructure problems. Efforts have been made in this project work to identify and plan some of the below facilities for sustainable development of village and to meet need of future population. Vishwakarma Yojana is one of the initiatives towards Rurbanization that is village development by the government of Gujarat, which was allotted as a real time situation type project provides to GTU.

It is one of the strategies to reduce urban city pressure and lower the migration rate by developing village with a “rural soul” but with all urban amenities that a city may have. In this project the students meet the relevant citizens of village and survey the existing facilities. Then design of the sustainable infrastructure which is to be modified is carried out for the village. This includes implementation of engineering skills to prepare detailed project reports for village as a part of the final year project work. By this project certain experiences recreates a real work and need of application of an individual technical knowledge on any existing problems. Based on survey we tried to give design of basic facilities to fulfill their needs. By providing these basic facilities to village for reduce urban city pressure and decrease migration rate, which is ultimate aim of Vishwakarma Yojana.

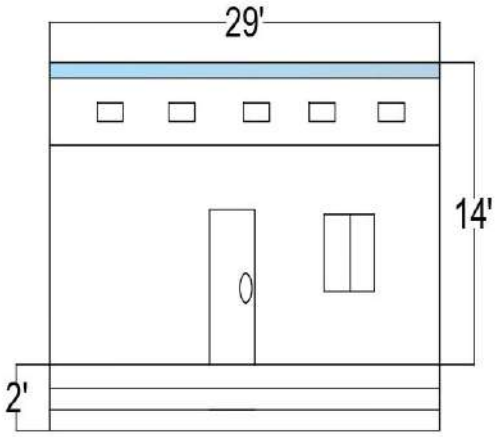
Village: Kunkni District: Surat



PLAN OF PANCHAYAT OFFICE



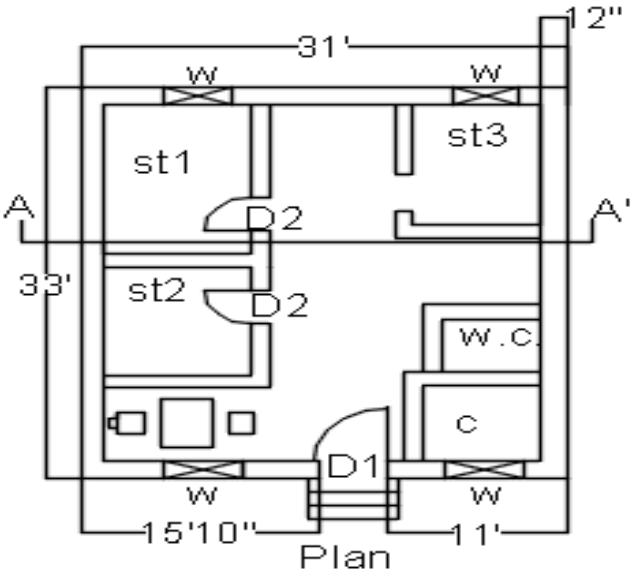
SECTION A-A'



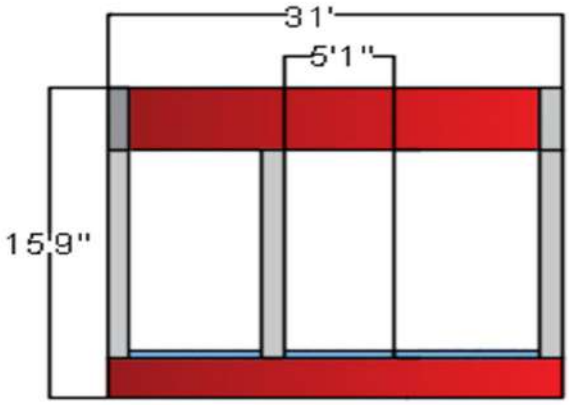
ELEVATION

Design Infrastructure – Reconstruction of Panchayat Building
Village – Kunkni, Olpad, Surat

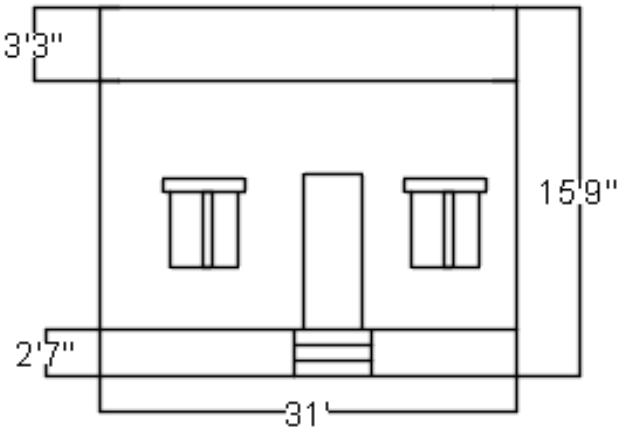
Village: Kunkni District: Surat



Plan



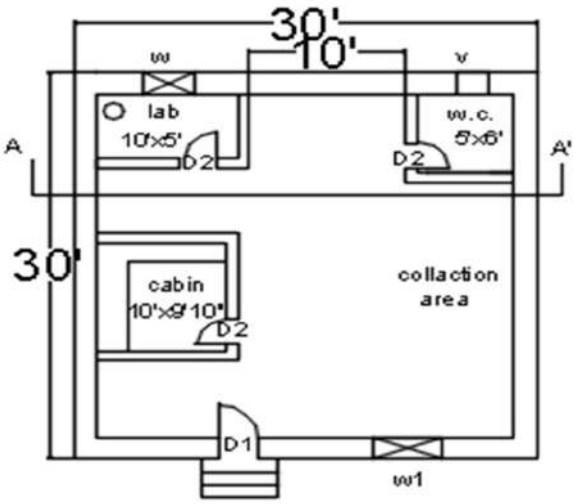
Section A-A'



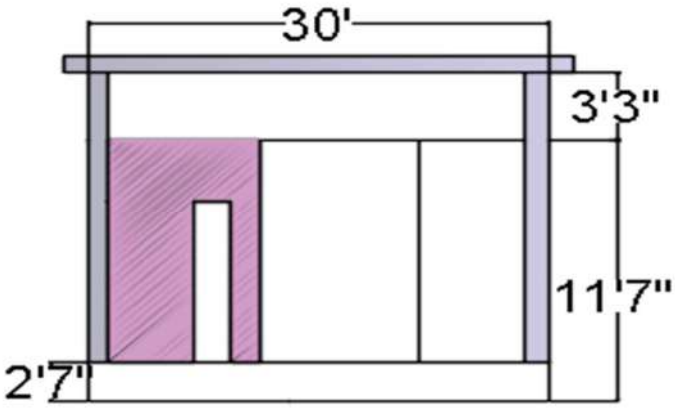
Elevation

Design Infrastructure – General Market
Village – Kunkni, Olpad, Surat

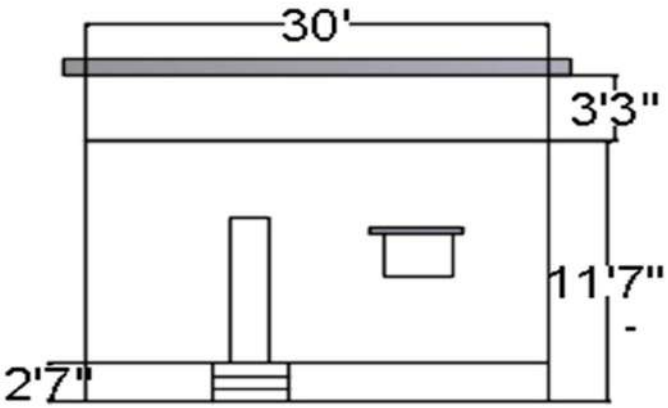
Village: Kunkni District: Surat



DAIRY PLAN



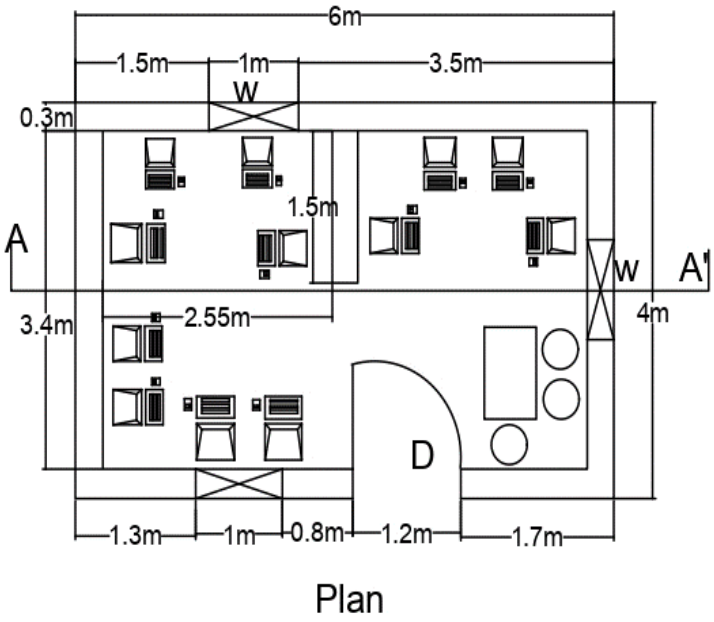
Section A-A'



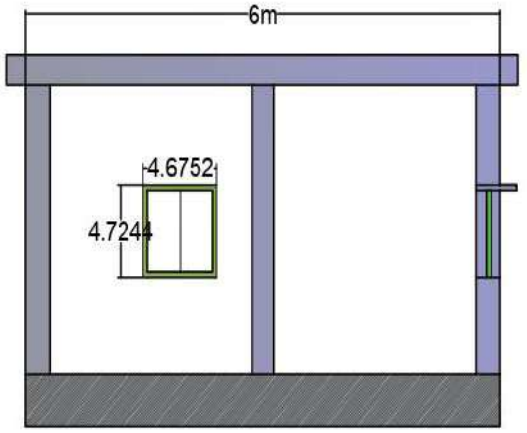
Elevation

Design Infrastructure – Reconstruction of Milk Dairy
Village – Kunkni, Olpad, Surat

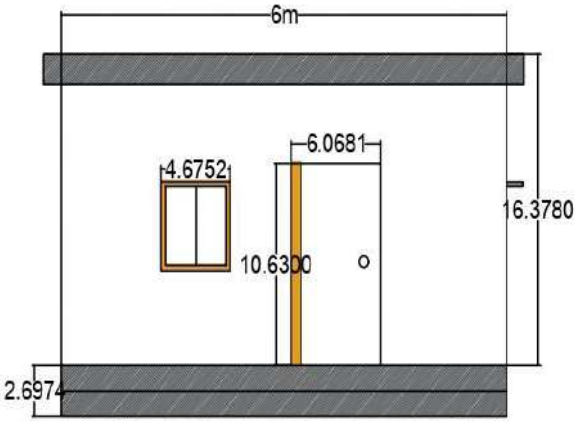
Village: Kunkni District: Surat



Plan



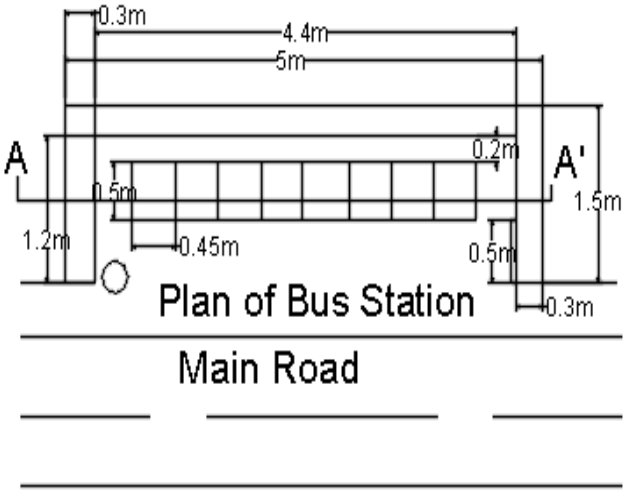
Section A-A'

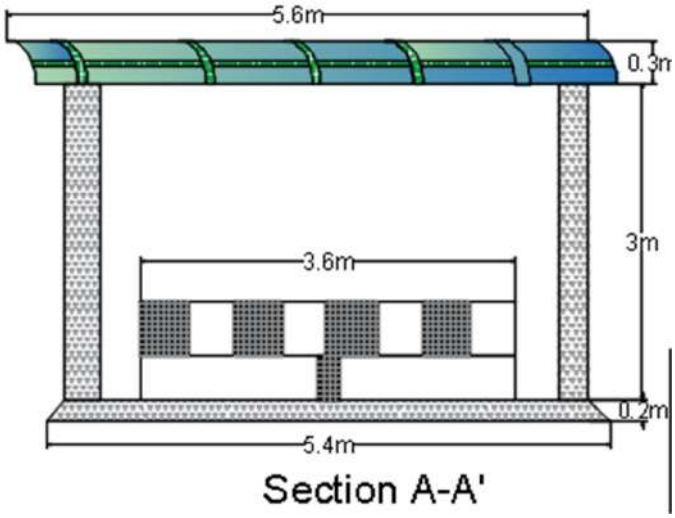


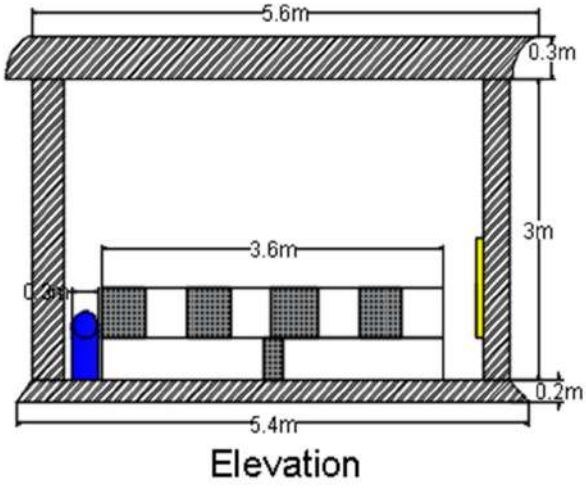
Elevation

Design Infrastructure – Computer Classes with Cyber Café
Village – Kunkni, Olpad, Surat

Village: Kunkni District: Surat

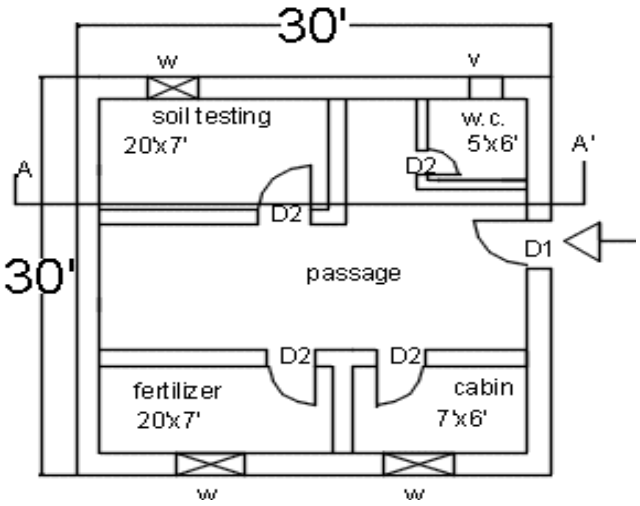




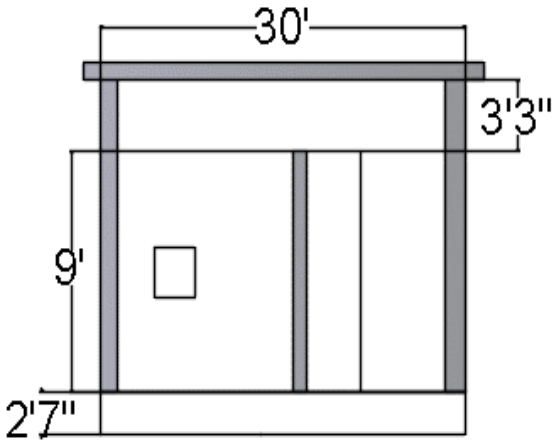


Design Infrastructure – Bus Stand
Village – Kunkni, Olpad, Surat

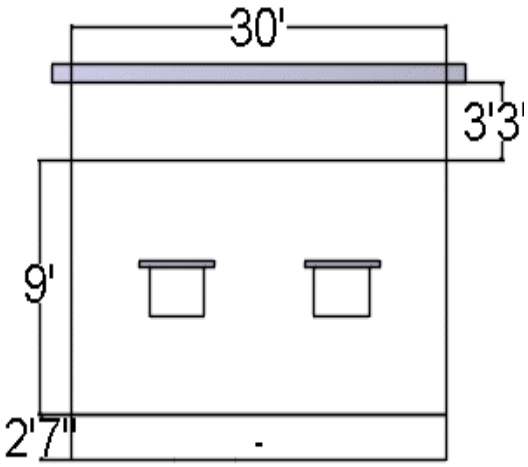
Village: Kunkni District: Surat



Plan



Section A-A'



Elevation

Design Infrastructure – Agriculture Co-Operative Society
Village – Kunkni, Olpad, Surat

NODAL OFFICER STATEMENT:

By providing this required facility to village, development and growth of village can be possible. So ultimately migration rate and urban city pressure can be reduced and livelihood of village dweller will increase

All the design which is given as above are very helpful for future development of village and village people for their enhancement and prosperity. I admire these students to do work related to civil & electrical engineering people and hope these works is help to improve and understand their skills and make it even better. I am sure they got deep knowledge about development of village and various infrastructure facility design of village. Lastly, we all enjoyed the informational as well as practical journey of civil engineering work.

Nodal Officer

Dr. Boski P. Chauhan
Civil Department
C.K. Pithawala College of Engineering and Technology.

Prof. Hetal H. Jivanramjiwala
Electrical Department
C.K. Pithawala College of Engineering and Technology.